

WAB906  
4/6/92

WAB906 7a

MEMORANDUM

DCN: TZ4-C10021-EP-10083

DATE: April 6, 1992

TO: Deborah Robinson

FROM: Stuart Strum

SUBJECT: RPA Recommendations for Pacific Wood Treating/Ridgefield Brick and Tile Landfill, Ridgefield, Washington  
EPA No. 68-W9-0008, SAIC/TSC Project No. 6-788-03-1400-140

A RCRA Preliminary Assessment was conducted at the Pacific Wood Treating/Ridgefield Brick and Tile Landfill located in Ridgefield, Washington. Two solid waste management units (SWMUs) were identified and evaluated in the course of this assessment. A summary of the conclusions regarding release potentials from each of the SWMUs identified during the RPA is presented below:

SUMMARY OF ONGOING RELEASE POTENTIALS OF SWMUs AT THE PWT/RBT LANDFILL						
SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
1	Former Ash Pile	L	L	L	L	L
2	Ash Landfill	L	L	L	L	L
<b>KEY</b> L = Low M = Medium H = High U = Unknown						

Based on the results of the evaluation performed at the facility, no further action under corrective action authorities is recommended for all SWMUs identified at the Pacific Wood Treating/Ridgefield Brick and Tile Landfill site.



Please feel free to contact Kathryn Gladden or myself at 206/485-2818 if you have any questions or comments regarding this memorandum.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION  
Technology Services Company

Stuart Strum

Enclosure

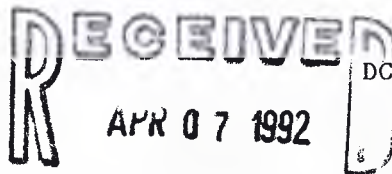
cc: M. Bailey, EPA RCRA Site Manager  
M. Slater, EPA Region 10 RCRA EPI Coordinator  
P. Rubenstein, EPA Region 10 CERCLA Project Officer  
T. Tobin, SAIC/TSC RPM



Science Applications International Corporation  
An Employee-Owned Company

**Technology Services Company**

April 6, 1992



DCN: TZ4-C10021-RN-10075

**RCRA COMPLIANCE SECTION**

Ms. Deborah Robinson  
U.S. Environmental Protection Agency  
Hazardous Waste Division (HW-112)  
1200 Sixth Avenue  
Seattle, Washington 98101

Re: EPA Contract No. 68-W9-0008, Work Assignment No. C10021, Pacific Wood  
Treating/Ridgefield/Brick and Tile Landfill RPA  
SAIC/TSC Project No. 6-788-03-1400-140

Dear Ms. Robinson:

Please find enclosed the draft RCRA Preliminary Assessment (RPA) report for the Pacific Wood Treating/Ridgefield Brick and Tile Landfill site located in Clark County, Washington.

Please feel free to contact Kathryn Gladden or myself at 206/485-2818 if you have any questions or comments regarding this report.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION  
Technology Services Company

Stuart Strum  
Hydrogeologist

Enclosure: As stated

cc: M. Bailey, EPA RCRA Site Manager  
M. Slater, EPA Region 10 RCRA EPI Coordinator (cover letter only)  
T. Tobin, SAIC/TSC RPM (cover letter only)  
K. Gladden, SAIC/TSC WAM (cover letter only)

RCRA PRELIMINARY ASSESSMENT  
PACIFIC WOOD TREATING/RIDGEFIELD BRICK AND TILE  
RIDGEFIELD, WASHINGTON  
EPA I.D. NO. WAD009036906

Prepared for:

U.S. Environmental Protection Agency  
1200 Sixth Avenue  
Seattle, WA 98101

Prepared by:

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Bothell, WA 98011

EPA Contract No. 68-W9-0008  
Work Assignment No. C10021  
SAIC/TSC Project No. 6-788-03-1400-140

April 1992

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## 1.0 INTRODUCTION

### 1.1 PURPOSE AND SCOPE OF THE RFA PROGRAM

The 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) provide authority to the Environmental Protection Agency (EPA) to require comprehensive corrective action on all solid waste management units (SWMUs) and other areas of concern (AOCs) at interim status hazardous waste management facilities where a release(s) of hazardous constituents has occurred. This includes RCRA interim status facilities, those applying for Part B permits, and those undergoing closure. The intent of this authority is to address previously unregulated constituents released to air, surface water, ground water, and soil and the generation of subsurface gases.

A major activity of the EPA's corrective action program consists of a RCRA Facility Assessment (RFA). According to the EPA's RCRA Facility Assessment Guidance Document (1), the purposes of an RFA are to:

1. Identify and gather information on releases at RCRA-regulated facilities
2. Evaluate SWMUs and AOCs for releases to all media, and regulated units for releases other than to ground water
3. Make preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility
4. Screen from further investigation those SWMUs which do not pose a threat to human health and the environment

The three basic steps of a RFA consist of a preliminary review (PR) of existing files and other generally available or requested information, a visual site inspection (VSI) to confirm and/or obtain additional information on past or present releases, and when warranted, a sampling visit to fill data gaps by obtaining field and analytical data.

### 1.2 REPORT CONTENTS

This report provides the results of the RCRA Preliminary Assessment (RPA) performed at the Pacific Wood Treating/Ridgefield Brick and Tile (PWT/RBT) Landfill site in Clark County, Washington. The RPA report combines the requirements of a RFA and a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment (PA). Primary sources of information utilized in this report include files and correspondence of EPA Region 10 and the Washington Department of Ecology (Ecology), additional information provided by the facility and observations made during the VSI. The VSI was conducted on February 20, 1992 by Stuart Strum of Science Applications International Corporation/Technology Services Company.

Section 2.0 of this report describes the PWT/RBT site and its operations. Information pertaining to the environmental setting is presented in Section 3.0. Section 4.0 provides a description of SWMUs and AOCs identified in the course of the assessment. The discussion of each SWMU and AOC includes available information on unit description, period of operation, wastes managed, release controls, release history, and information obtained during the VSI.



## 2.0 FACILITY DESCRIPTION

### 2.1 LOCATION AND HISTORY

The Pacific Wood Treating/Ridgefield Brick and Tile (PWT/RBT) Landfill site is located two miles northeast of Ridgefield, Washington on 289th Street in the northeast 1/4 of the southeast 1/4 of section 17, T4N R1E (Figure 1). The facility is a closed landfill that has been used for disposal of hog fuel boiler ash generated at the PWT facility located in Ridgefield, Washington. (6,8)

Prior to the disposal activities by PWT, the site had been operated as a brick and ceramic tile manufacturing facility under the name Ridgefield Brick and Tile Company. The property and the manufacturing operation were owned by Elmer Muffet. Manufacturing operations at the site had ceased prior to disposal of wastes by PWT. Beginning in 1979, boiler ash from the PWT facility in Ridgefield was disposed at the site, along with solid wastes including wood wastes, tree stumps, scrap timber, and other solid wastes. PWT agreed to close the disposal area by draining the former clay pit at the site, constructing a liner, underdrain and toe drain system, placing the waste in the pit, and capping the landfill. PWT purchased the property from Elmer Muffet in 1983 during the closure activities. (3,8,15)

### 2.2 IDENTIFICATION OF SOLID WASTE MANAGEMENT UNITS

During the course of this assessment, two SWMUs were identified. These units are the landfill (SWMU 1) and the former ash storage pile (SWMU 2). Locations of the SWMUs are shown on Figure 2.

### 2.3 HAZARDOUS WASTE MANAGEMENT

Ash generated in the hog fuel boiler at the PWT Ridgefield Plant was stored in the former waste storage pile (SWMU 2) and was disposed in the landfill (SWMU 1) at the PWT/RBT site from 1979 until January 4, 1983. The boiler fuel was woodwaste from the wood treating facility. Waste water treatment at the PWT Ridgefield Plant generated sludges from treatment of copper chrome arsenic (CCA) and pentachlorophenol (PCP) wastes that are listed hazardous wastes (K001). The waste water treatment sludges were sprayed onto wood used as fuel in the boiler and was incinerated. This process resulted in the boiler ash being designated as K001 waste due to the "derived from" standard for listed hazardous wastes. Because the facility was unaware of the regulatory status of the boiler ash until 1983, when an enforcement order was issued by Ecology, the ash was managed as a solid waste and was stored in the former waste pile for disposal at the landfill unit. The excavation for the landfill was the existing clay pit that had been dug during operation of the Ridgefield Brick and Tile Company at the site. Upon receipt of the order, PWT developed and implemented the closure of the landfill by constructing the underdrain, liner and toe drain system, moving the ash from the waste pile into the landfill, and capping the unit. Due to the geologic

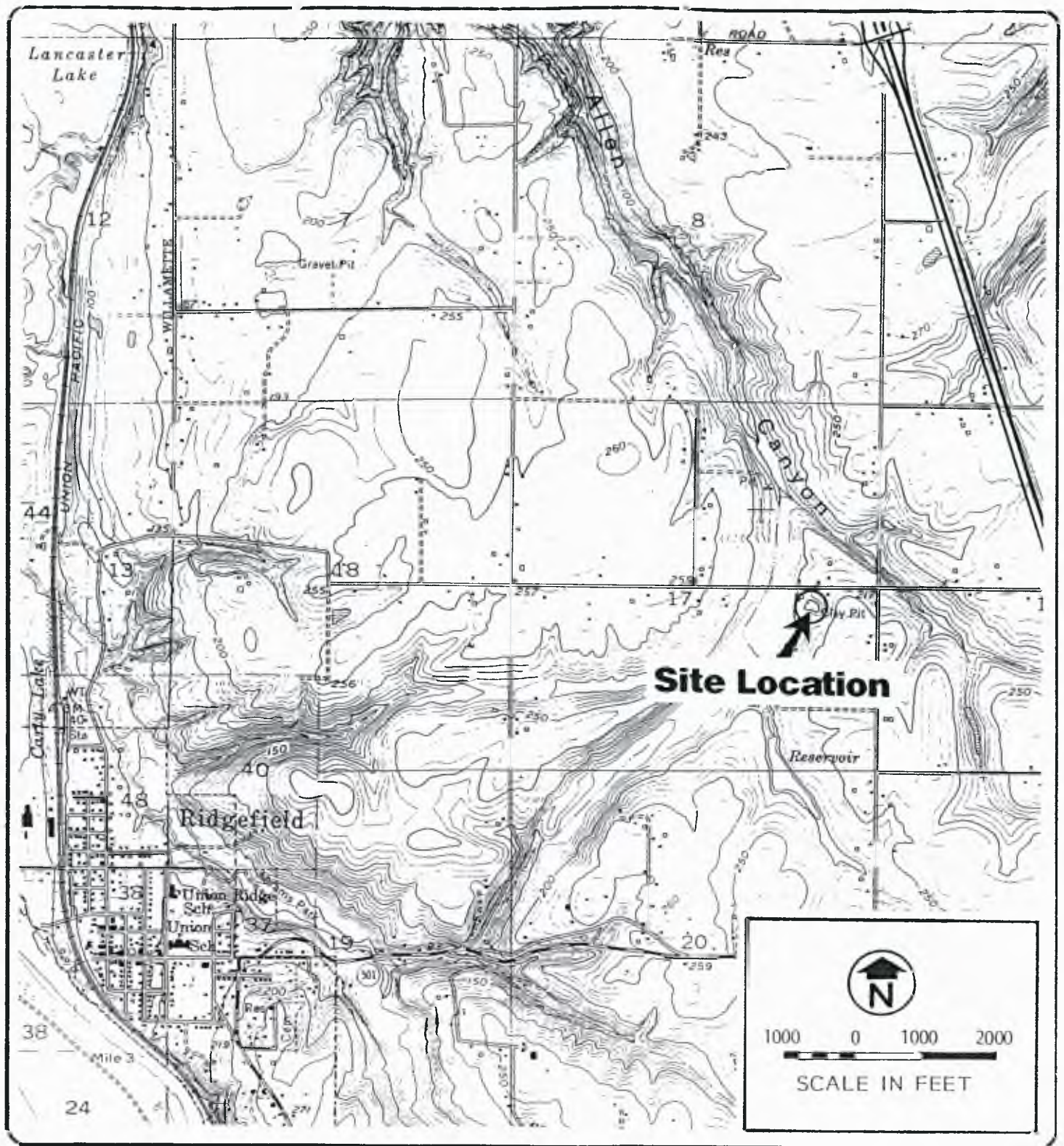


Figure 1

SITE LOCATION MAP  
 PACIFIC WOOD TREATING/RIDGEFIELD BRICK AND TILE LANDFILL  
 RIDGEFIELD, WASHINGTON  
 Source: Reference 6



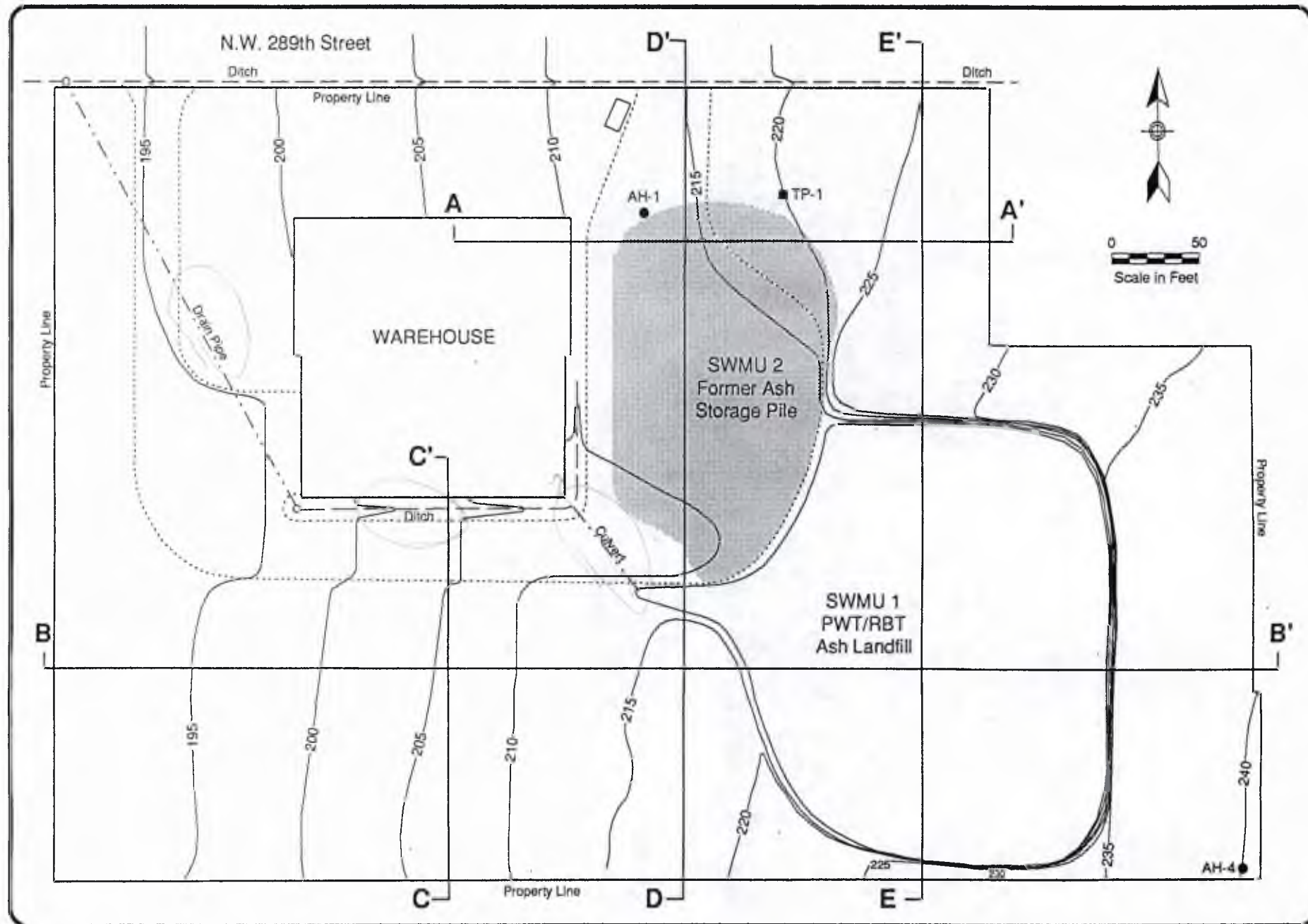


Figure 2

LOCATION OF SOLID WASTE MANAGEMENT UNITS AT THE PWT/RBT SITE

setting of the unit, PWT attempted to implement ground water monitoring by sampling and analysis of the underdrain discharge, and by installation of piezometers. Leachate collected in the toe drain flows to a collection tank. Drummed leachate is shipped to a commercial TSD as K001/D004 waste.(3,8,9,14,15)

## 2.4 REGULATORY HISTORY

### 2.4.1 RCRA Notification and Permit History

Pacific Wood Treating filed a Notification of Hazardous Waste Activity for generation, treatment, and storage of wood treating wastes at the Ridgefield Plant on November 8, 1980. Because PWT had not identified the sludge derived boiler ash as a hazardous waste, the landfill ash disposal was not included in this notification. PWT submitted a Part A permit application for the RBT landfill unit (SWMU 1) on May 26, 1983. An initial notification of dangerous waste activity was filed with Ecology on April 1, 1985.(8,9)

The Part B permit application for the PWT/RBT site was called in on April 9, 1985 with a due date of October 11, 1985. A Consent Agreement between the facility and EPA dated November 21, 1986 required the Part B to be submitted. The agreement also required the facility to submit an approvable closure plan, including ground water monitoring requirements. A 3008(a) Compliance Order was issued by EPA on September 27, 1989 requiring submittal of the Part B within 90 days. The file materials reviewed did not include a Part B permit application for the PWT/RBT facility.(22,23)

### 2.4.2 RCRA Interim Status Compliance History

Two RCRA CEIs and one Comprehensive Monitoring Evaluation (CME) have been performed at the PWT/RBT site. The April 25, 1985 CEI conducted by Ecology documented that the facility did not comply with interim status financial assurance requirements. The June 10, 1987 CEI conducted by EPA documented that the facility had no waste analysis plan and no warning signs posted on the fence around the landfill.(11,24)

Ecology notified PWT that the landfill was a regulated unit and that closure would be required in Notice of Penalty No. DE 83-284, issued on June 20, 1983. The Closure Plan was submitted by the facility on July 15, 1983 and the Certification of Closure Report was submitted on February 15, 1984. The CME performed on June 12, 1984 determined that the monitoring of nearby domestic wells did not comply with the interim status ground water monitoring requirements of 40 CFR 265 Subpart F and the post closure monitoring requirements because this monitoring system could not immediately and reliably detect a release of hazardous waste or hazardous constituents from the unit. The ground water monitoring program currently in place at the facility has not been approved by EPA.(4,10,11,24)

### 3.0 ENVIRONMENTAL SETTING

#### 3.1 LOCATION AND SURROUNDING LAND USE

The PWT/RBT Landfill site is located in the northeast 1/4 of the southeast 1/4 of section 17, T4N R1E, at approximately 122°42'19" longitude and 45°49'50" latitude. The site is located in the "Fourth Plains" upland area between the floodplain of the Columbia River to the west and the foothills of the Cascade Mountains to the east. Adjacent land uses include agricultural land (pasture and crop production) and rural residential. Residential and commercial areas of the town of Ridgefield are two miles southwest of the site.(6,25)

The PWT/RBT Landfill site is currently inactive, no workers are present on-site. The nearest individual to the site is at a residence approximately 100 feet west of the facility. Population within four miles of the site is distributed as follows:

- 0 - 0.25 mile: 12
- 0.25 - 0.5 mile: 20
- 0.5 - 1 mile: 234
- 1 - 2 miles: 300
- 2 - 3 miles: 1,697
- 3 - 4 miles: 300

(references: 6,15,25)

#### 3.2 METEOROLOGY

The PWT/RBT site is located adjacent to the Columbia River Valley, west of the Cascade Mountains. This area has a maritime climate, characterized by wet, cool winters and mild, dry summers. The average temperature ranges from 38°F in January, to 64°F in July. The average annual temperature is 51°F. Total annual precipitation is 39 inches, and net annual precipitation is 19 inches. Average monthly precipitation ranges from 0.5 inches in July to 7.1 inches in December. The two-year 24-hour precipitation is 2.3 inches.(16,26)

#### 3.3 SURFACE HYDROLOGY

The site does not lie within the 100 year floodplain of the any of the nearby drainages. Surface drainage is relatively good because the ground surface has a slope of 8 per cent across the site. The drainage from the site is towards the northwest, discharging into the unnamed stream that flows into Mud Lake and eventually, the Lewis River. The upgradient drainage area is approximately 30 acres, due to the location of the site on the flank of a hill that acts as a drainage divide to the small tributary that drains the site area.(6)

There are approximately 450 acres of wetlands within four miles of the site, and four linear miles of wetland exposure have been mapped downstream from the site.(28)

Surface soils at the site are silt loams of the Gee series. These soils are moderately permeable and with good drainage. Runoff is slow from this soil type.

No surface water intakes for drinking water downstream of the facility have been identified. Upstream irrigation intakes are used to withdraw water from the East Fork of the Lewis River in this portion of Clark County.(16,17,18)

The Lewis and Columbia Rivers are used extensively for both sport and commercial fishing. They are also migration pathways for salmon that spawn upstream in the Columbia and Lewis River drainage basins.(21)

### 3.4 GEOLOGY AND GROUND WATER HYDROLOGY

The PWT/RBT site is located in the "Fourth Plains" terrace of southwestern Washington, between the alluvial valley of the Columbia River to the west and the foothills of the Cascade Range to the east. The site is underlain by unconsolidated Quaternary sediments of alluvial and deltaic origin. The unconsolidated deposits are underlain by the Pliocene Troutdale Formation in this portion of Clark County, and the Troutdale Formation is exposed in the valley of the unnamed creek west of the PWT/RBT site. The Troutdale Formation is comprised of an upper gravel member and a lower sand and silt member. Sand interbeds in the lower member of the Troutdale formation serve as the primary water supply in the vicinity of the PWT/RBT site (Figure 3). Older consolidated rocks underlying the Troutdale Formation are Eocene to Miocene volcanic and sedimentary rocks. These formations do not serve as significant aquifers in western Clark County due to the depths (several hundred feet below land surface) and low yields of these units.(2,3,4,5,17,19,20)

Subsurface soil samples collected at the site from the unconsolidated Quaternary sediments have been classified as stiff silty clay, silty micaceous sand and well sorted sand. This unit is up to 40 feet thick at the site, and the silty clay overlies the sand interval at the eastern side of the site. The lower sandy interval thins to the west, and pinches out west of the landfill (Figures 3,5,6). The excavation for the landfill was formed during quarrying of the silty clay for brick and tile manufacturing. The bottom of the excavation is at the top of the sand interval; the downward advancement of the pit was halted at the clay - sand contact.(3,4,5,10)

The Troutdale Formation of Pliocene age underlies the Quaternary sediments across the site and adjacent areas. The upper portion of the Troutdale Formation penetrated by borings at the site is a silty sandy gravel. The gravel clasts of the conglomerate beneath the upper contact have been weathered to clay. The weathering of rock clasts in the upper portion of the Troutdale Formation is common in the area, often resulting in a significant increase in the clay content due to post depositional alteration of the gravels. The alteration of the gravels of the uppermost Troutdale Formation at the site has reduced the hydraulic conductivity to less than  $10^{-5}$ cm/sec.(2,10)

During the closure of the landfill, the facility attempted to establish a monitoring network by sampling existing domestic wells at adjacent properties to the east, north and west of the site. After EPA found that this approach did not



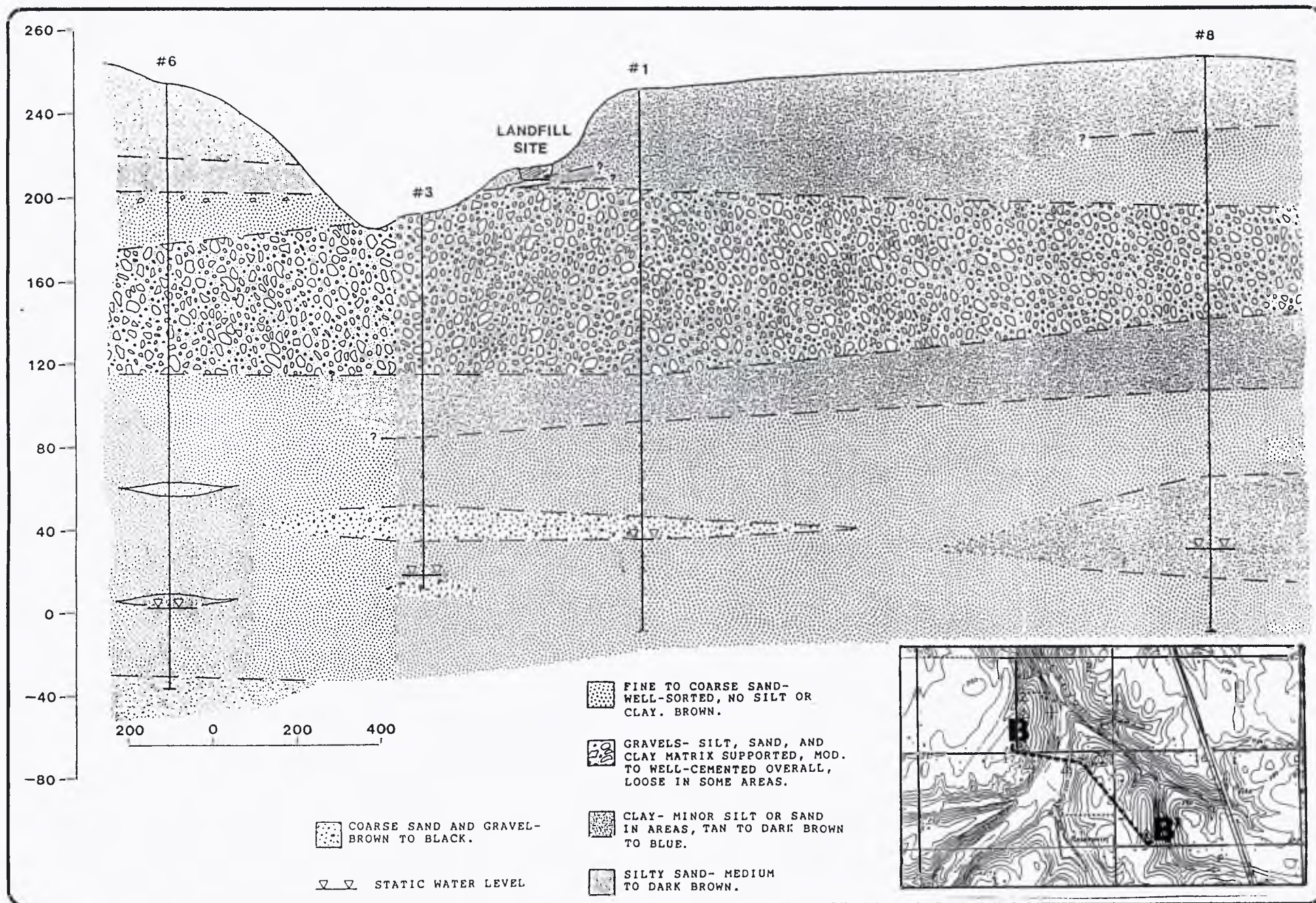


Figure 3

REGIONAL GEOLOGIC CROSS SECTION OF THE PWT/RBT SITE

Source: Reference 14

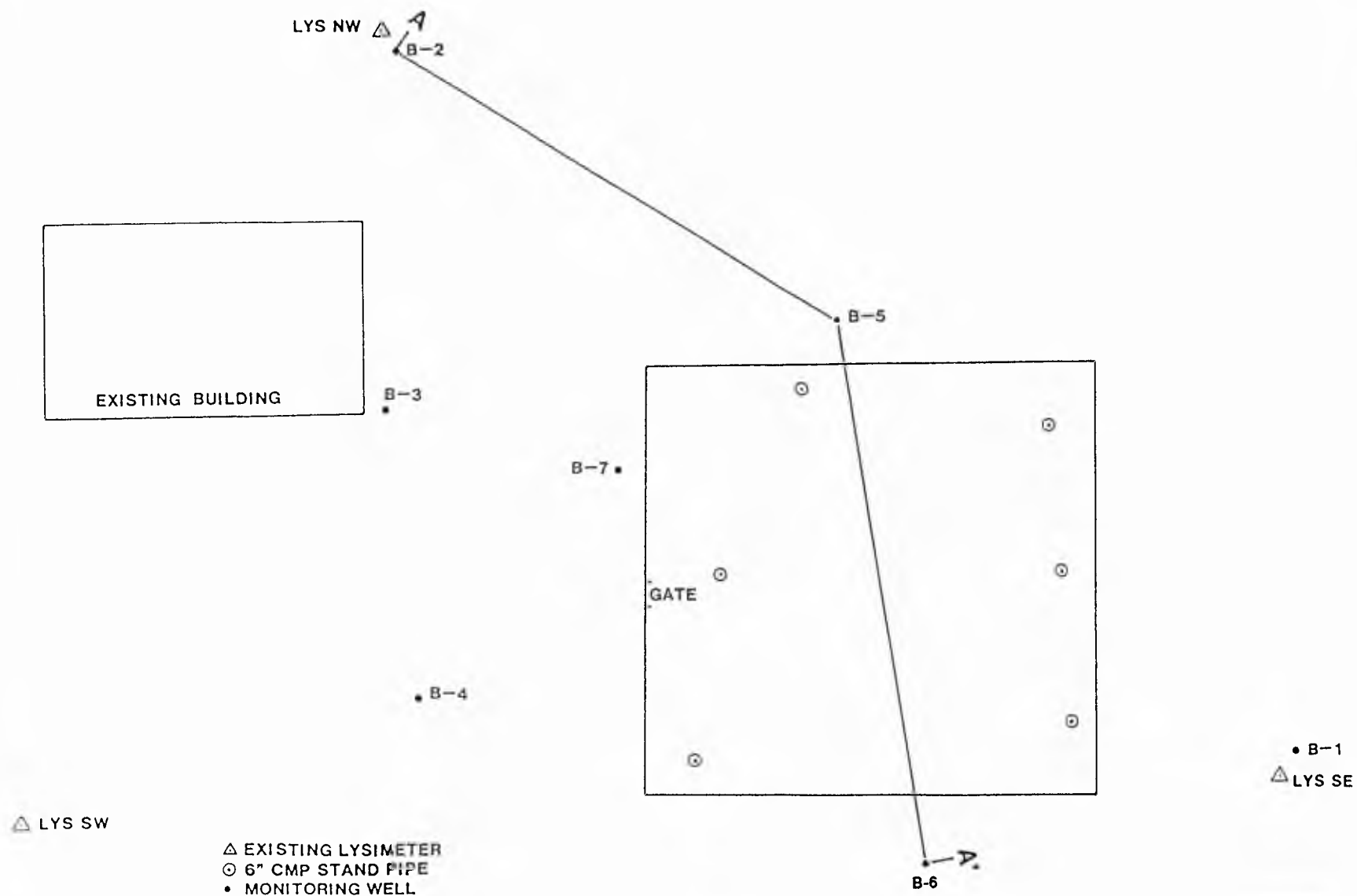


Figure 4

MONITORING WELL AND CROSS SECTION LOCATIONS  
 PWT/RBT LANDFILL SITE

Source: Reference 14



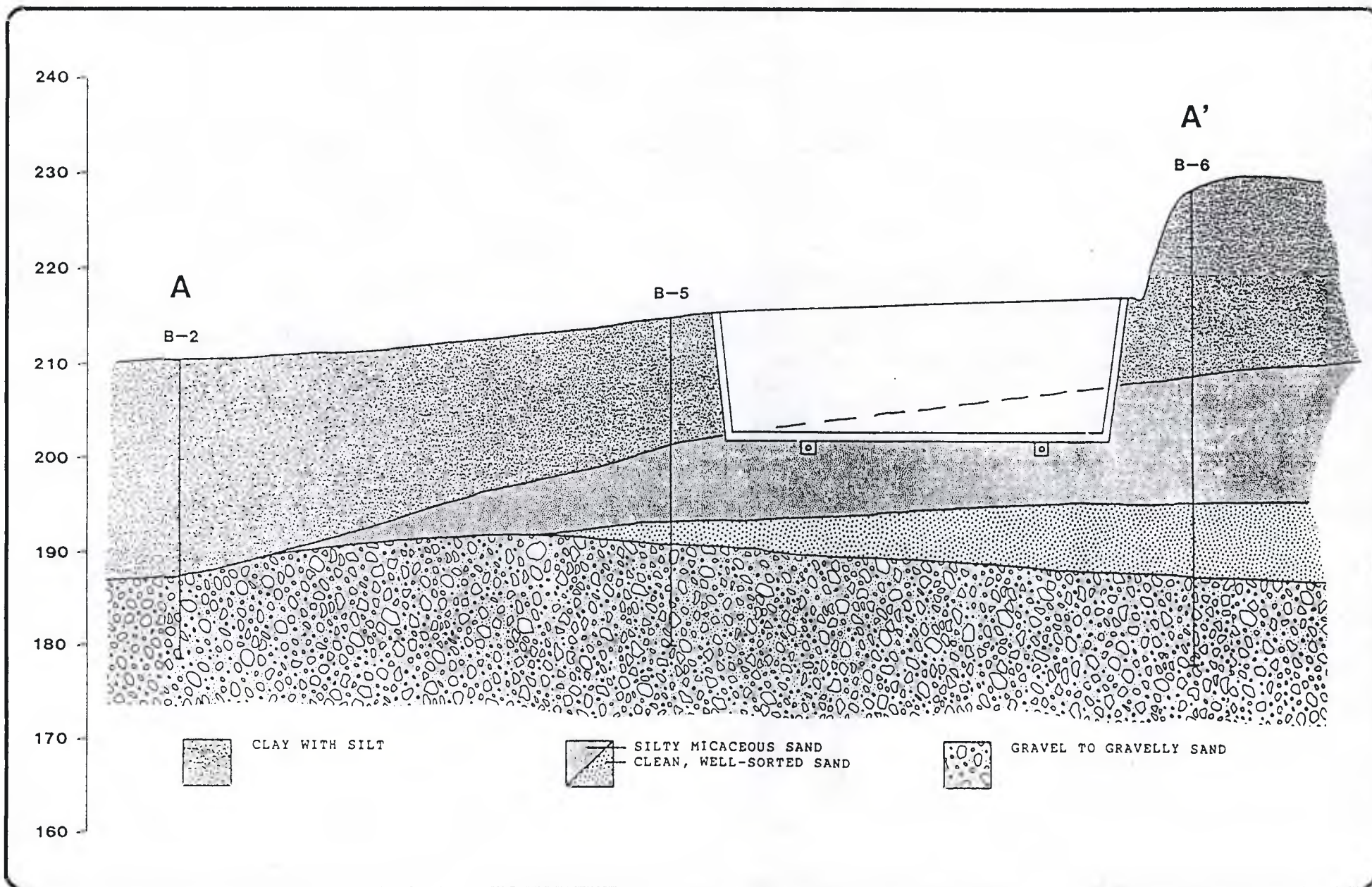


Figure 5

CROSS SECTION OF THE PWT/RBT LANDFILL SITE

Source: Reference 14

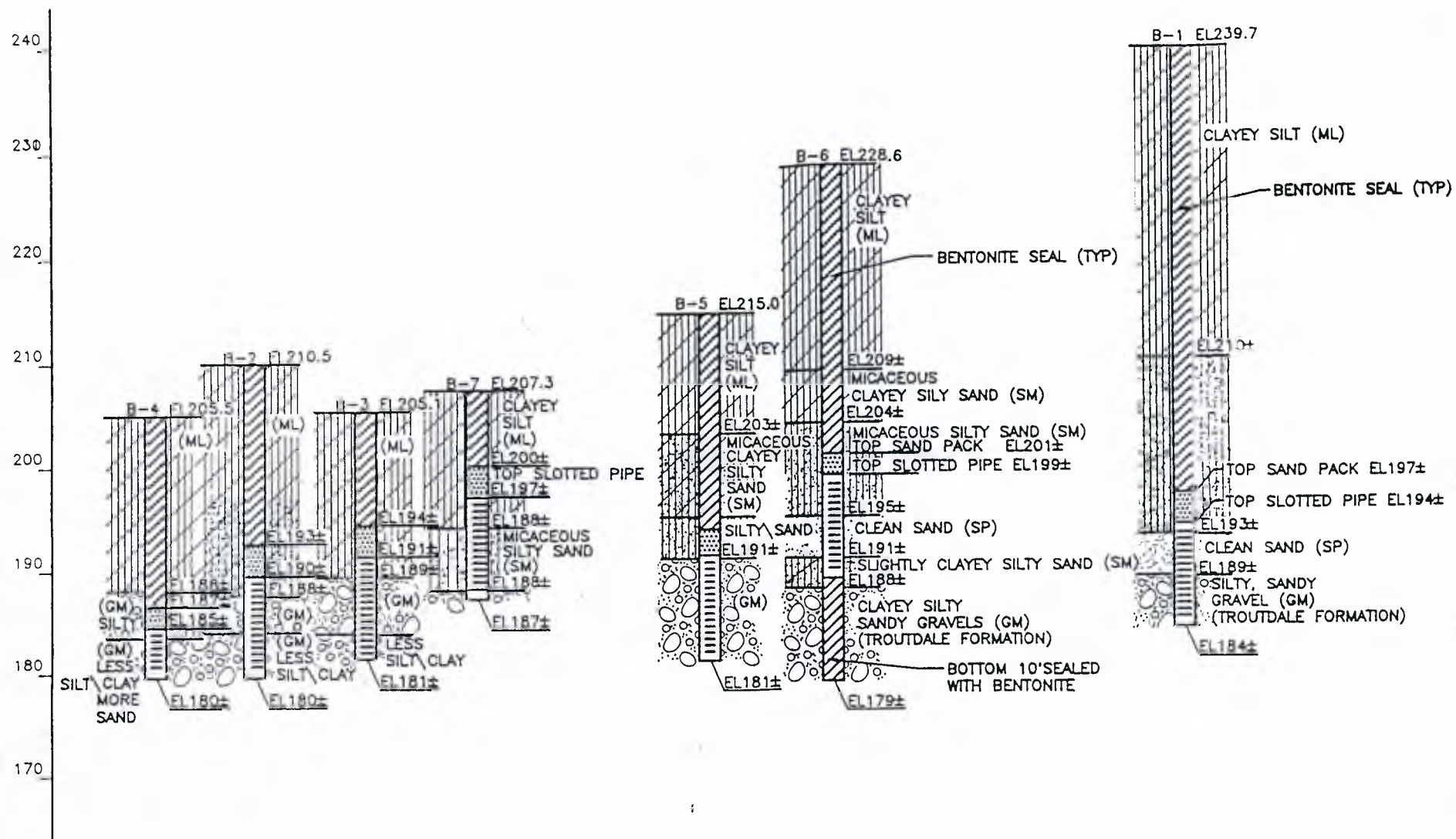


Figure 6

ILLUSTRATION OF MONITORING WELLS  
 RIDGEFIELD BRICK AND TILE SITE, RIDGEFIELD, WASHINGTON  
 Source: Reference 14



meet the regulatory requirements for a monitoring system to immediately detect releases from the unit, a series of lysimeters and monitoring wells were installed around the landfill. Site specific monitoring was attempted by installation of lysimeters in the sand layer at the landfill, due to the absence of saturated conditions in the sand layer except during late winter or early spring wet conditions. The lysimeters failed and could not be used to reliably sample the sand interval during unsaturated conditions.(3,4,5,7,10)

In August of 1987, seven monitoring wells were installed at the landfill. The wells were completed with screened intervals placed in the sand present in the lower portion of the unconsolidated sediments, except where the sand is absent to the west of the landfill. Monitoring well completions are illustrated in Figure 4. Where the sand was not present, the monitoring wells were completed in the uppermost portion of the Troutdale Formation. Water level monitoring conducted in the newer monitoring wells indicated that the lowermost part of the sand unit beneath the landfill (up to one foot thick) is ephemerally saturated during wet season conditions. Because the monitoring wells have been constructed with the sand pack interval across the contact between the Troutdale Formation and the overlying Quaternary sediments, the horizontal flow direction in the sand unit and the hydraulic relationship with the Troutdale can not be determined from available information. Toe drain leachate analyses detected hazardous constituents associated with the wastes in the landfill, including arsenic pentachlorophenol; however, hazardous constituents (arsenic) have been detected in ground water samples only in very low (9 ug/liter) concentrations (see section 3.6).

Ground water use within four miles of the facility is distributed as follows:

- 0-0.25 mile: 12
- 0.25-0.5 mile: 6
- 0.5-1 mile 15
- 1-2 miles: 175 (217 acres irrigated by wells)
- 2-3 miles: 1,504 (the City of Ridgefield operates water supply wells in this distance interval)
- 3-4 miles: 56

The nearest water supply well to the site is the Steve Randall well located approximately 200 feet east of the site.(3)

### 3.5 CRITICAL HABITATS/ENDANGERED OR THREATENED SPECIES

The Ridgefield National Wildlife Refuge is located adjacent to the Columbia River two miles southwest of the facility. The wildlife refuge is upstream of the confluence of the Lewis and Columbia Rivers, and is not downstream of the facility.(27)

### 3.6 SITE MONITORING DATA

Ground water monitoring has been attempted through the implementation of three systems at the site since 1983. In response to the Complaint and Compliance Order from Ecology to close the landfill as a regulated land disposal unit, PWT initiated a monitoring program for existing domestic wells around the facility. EPA determined that this approach did not meet the requirements for a ground water monitoring system as required under 40 CFR 265 Subpart F, and instructed the facility to develop a site-specific monitoring program. Due to uncertainties associated with the present monitoring system, including insufficient data to determine ground water flow direction beneath the landfill and hydraulic relationship between the alluvial sediments and the Troutdale Formation, the characterization of site hydrogeology has not clearly determined the ground water flow direction.(3,4,13)

In addition to samples from monitoring wells, the toe drain has been sampled and analyzed to characterize leachate from the landfill and the underdrain has been sampled to determine the quality of ground water discharged from beneath the liner through this system. Hazardous constituents included in the analyses performed have included metals, pentachlorophenol, and PAHs. While some hazardous constituents have been detected in ground water at the site, the concentrations present do not indicate a significant release has occurred from the landfill that could be attributed to a plume of contamination, or that approaches MCLs or other health-based water quality criteria. The results of the monitoring program are summarized in Appendix A.

#### 4.1.2 Conclusions

Monitoring data collected at the landfill and observations made during the VSI do not provide any evidence of significant releases to ground water from the unit. The diversion of run on around the unit and the presence of a maintained cover preclude the possibility of releases to surface water, surface soil or air. The ground water monitoring data available at the unit do not indicate that ground water contamination has occurred at the site.

Due to the placement and construction of the wells and the presence of ground water in the shallow sand unit, the direction of ground water flow and relationship between the sand unit and the uppermost Troutdale Formation have not been demonstrated. The monitoring program should be revised by abandoning wells screened in both units and installing wells that monitor the two zones to allow at determination of the hydraulic relationships at the unit to provide for reliable monitoring at the landfill. It is not anticipated that contamination warranting further investigation will be detected by this modified monitoring program; however, these modifications are needed to meet the requirements of closure under interim status and issuance of a closure permit.

#### 4.0 DESCRIPTION OF INDIVIDUAL UNITS

Two SWMUs were identified and evaluated at the PWT/RBT Landfill site (Figure 2). The following sections provide descriptive and historical information on each SWMU, including an evaluation of their release potentials to all media of concern.

##### 4.1 SWMU 1 - ASH LANDFILL

###### 4.1.1 Information Summary

Unit Description: SWMU 1 is a landfill that was constructed for disposal of hog fuel boiler ash generated at the PWT facility in Ridgefield, Washington. The unit contains a total of 28,000 cubic yards of waste, including up to 240 tons of bottom, multi-cone, and baghouse ash designated as D004 and K001 wastes due to the arsenic concentration of the ash and waste water treatment sludge fed to the boiler.(8)

Dates of Operation: Construction of containment, including the underdrain, liner and toe drain systems was performed in 1983 and waste was placed in the landfill during the fall of 1983. Final closure of the unit was certified in February 1984, and wastes are still present in the disposal unit.(4)

Wastes Managed: The wastes present in the unit include bottom, multi-cone, and baghouse ash designated as D004 and K001 waste due to the arsenic concentration of the ash and the waste water treatment sludge fed to the hog fuel boiler. Other wood wastes, including log yard wastes and tree stumps, were also disposed at the site.(3,8)

Release Controls: The unit was constructed with an underdrain system, a clay liner, a leachate collection system (toe drain), gas vents, a clay cap, a vegetated soil layer over the cap and gas vents. Run on is diverted from the site in run on control ditches around the north, east, and south sides of the unit. The toe drain and underdrain lines are PVC drain lines in gravel drainage trenches located above and below the liner. The liner was constructed of a four inch thick layer of compacted soil amended with bentonite placed above a 1.5 foot thick compacted soil layer. The cap is a 1.5 foot compacted soil layer. All compacted soil used in landfill construction was compacted to greater than 90 per cent relative compaction. The unit is surrounded by a three-strand barbed wire fence to prevent access.(4,15)

History of Releases: Monitoring data collected from lysimeters, drains, and monitoring wells have not detected any significant releases from the unit. Air releases have not occurred from the unit due to the absence of volatile hazardous constituents and the presence of the cap. Surface soil and surface water releases have not occurred due to the presence of the cap and the diversion of runoff around the unit in the diversion ditches.

## 4.2 SWMU 2 - FORMER ASH STORAGE PILE

### 4.2.1 Information Summary

Unit Description: SWMU 2 was operated as a storage pile at the facility where boiler ash (K001 and D004) and wood wastes were stored at the site until the landfill cell was constructed and the wastes were placed in that unit. (3,4,8,9)

Dates of Operation: Wastes were stored in the waste pile from December of 1979 until the wastes were moved to the landfill during the closure operation in October, 1983. (4)

Wastes Managed: The wastes stored in the unit included bottom, multi-cone, and baghouse ash designated as D004 and K001 waste due to the arsenic concentration of the ash and the waste water treatment sludge fed to the hog fuel boiler. Other wood wastes, including log yard wastes and tree stumps were also stored in the waste pile. (3,8)

Release Controls: No release controls for this unit were identified in the file information.

History of Releases: No evidence of releases from the waste pile were identified in the file information or from observations made during the VSI.

### 4.2.2 Conclusions

Due to the removal of all wastes from the unit in 1983 during the closure of the landfill, and the absence of any contamination detected at the facility that could be attributed to the waste pile, the potential that releases have occurred from this unit is judged to be low.

## REFERENCES

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2. Mundorff, M.J. Geology and Ground Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer along the Columbia River, U.S. Geological Survey Water Supply Paper 1600. 1964.
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APPENDIX A

SITE MONITORING DATA

TOE DRAIN LEACHATE ANALYSES  
(concentrations in ug/l)

Analyte	Sample Date														
	12/20/83	1/11/84	3/26/84	6/12/84	12/12/84	2/27/86	2/27/86	12/23/8	1/8/87	1/29/87	3/16/87	5/23/88	1/12/90	6/4/90	3/28/91
	(duplicate)														
Naphthalene	10	5	5U	0.1U	1U	4.9	6.1	0.5	3	10U	15U	10U	1U		1U
Phenol														1U	
Pentachlorophenol	0.6	1.3	2.7	0.1U	0.8	1.1	1U	1U	1.5	1U	1U	0.3	1U	1U	5U
Benz(a)anthracene														5U	1U
Benzo(a)pyrene														5U	1U
Dibenz(a,h)anthracene												0.05U	3U	5U	2U
Arsenic	9	5U	8	5U	5U	5U	5U	5U	5U	5U	5U	6	5U		5U
Chromium											5U	8U	5U	1.5	5U

No value: analysis not performed

U: analyte not detected at the reporting limit

Ground Water Monitoring Data  
PWT/RBT Landfill Site  
(concentrations in ug/l)

Sample Date	1/12/90			11/20/92		3/28/91			4/9/91	
Monitoring Well	B-1	B-4	B-5	B-4	B-5	B-4	B-5	B-6	B-1	B-3
Analyte										
Naphthalene				1U	1U	1U	1U	1U	1U	1U
Pentachlorophenol	0.1U	0.1U	0.1U	5U	5U	5U	5U	5U	5U	5U
Benz(a)anthracene	3U	3U	3U	1U	1U	1U	1U	1U	1U	1U
Benzo(a)pyrene	3U	3U	3U	1U	1U	1U	1U	1U	1U	1U
Dibenz(a,h)anthracene	3U	3U	3U	2U	2U	1U	1U	1U	1U	1U
Arsenic	5U	7	5U	5U	5U	5U	5U	5U	5U	5U
Chromium	5U	5U	5U	10U	10U	5U	5U	5U		

No value: analysis not performed

U: analyte not detected at the reporting limit

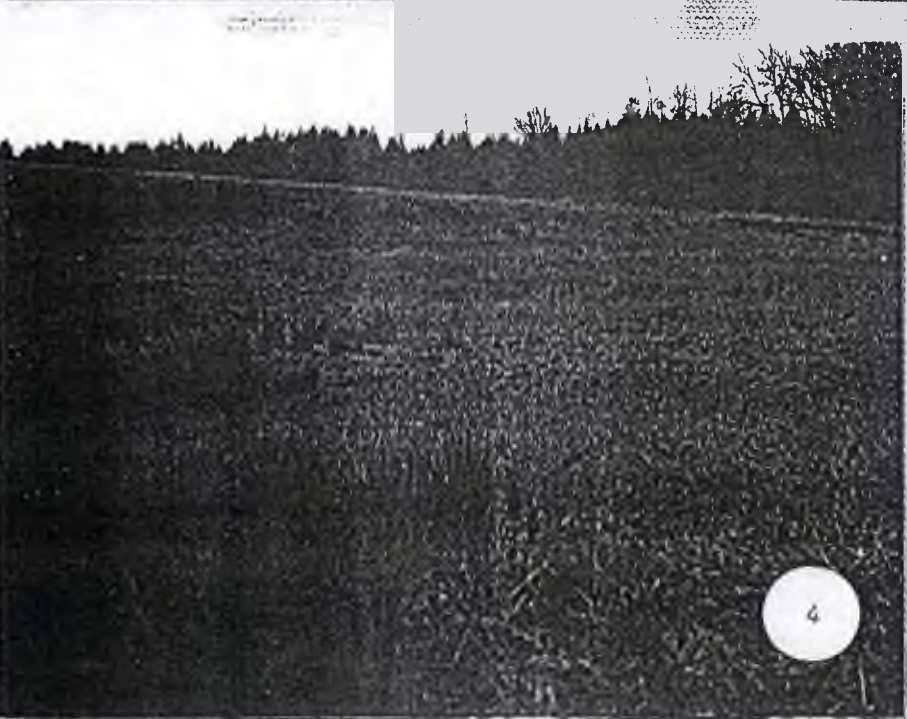
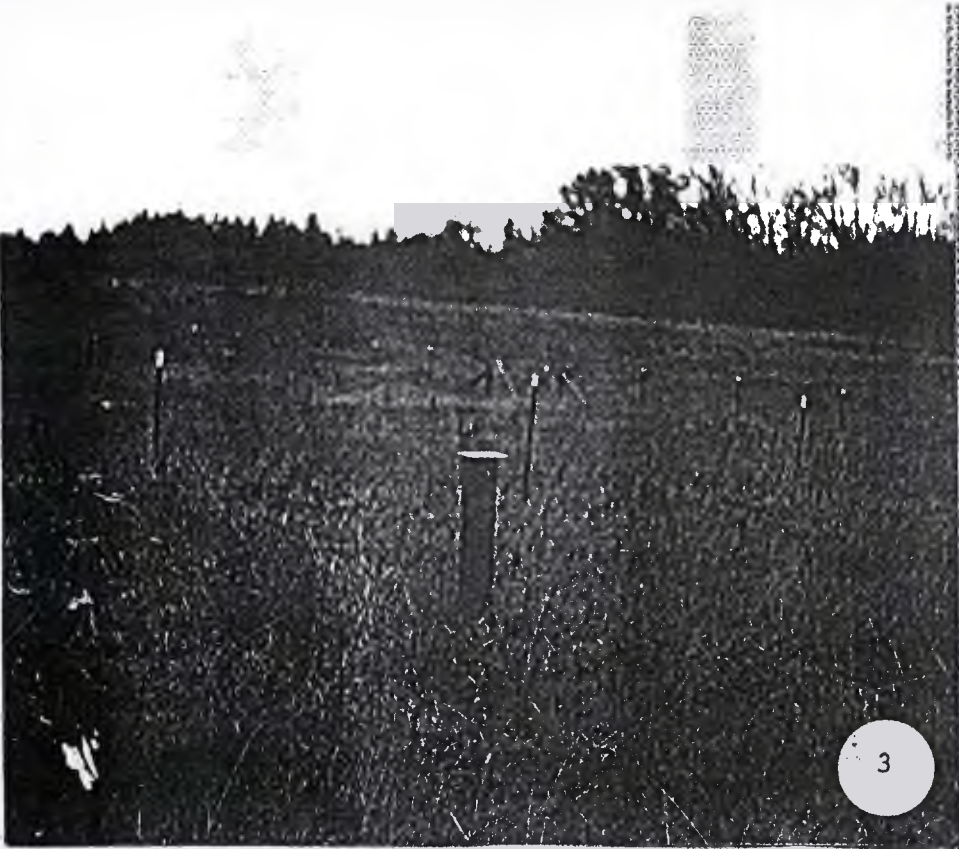
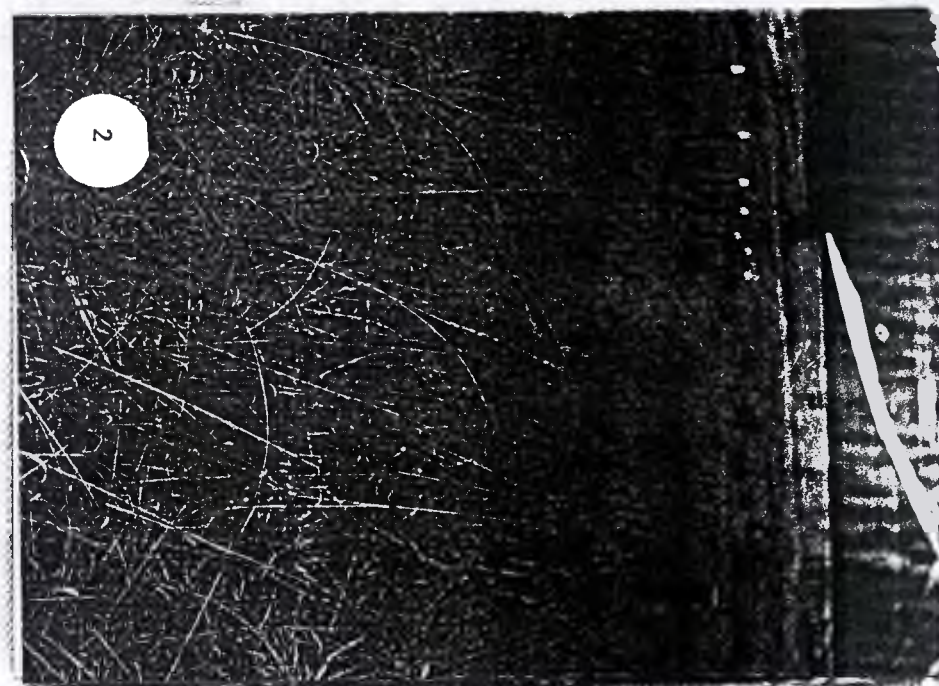
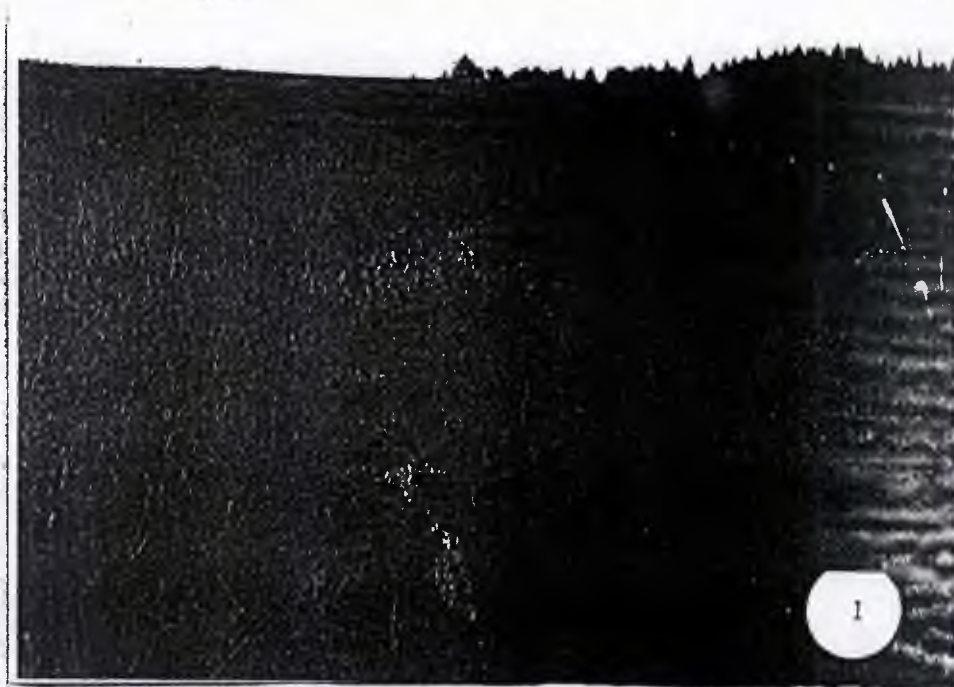
APPENDIX B  
VSI PHOTOGRAPH LOG

<u>Photo No.</u>	<u>Description</u>
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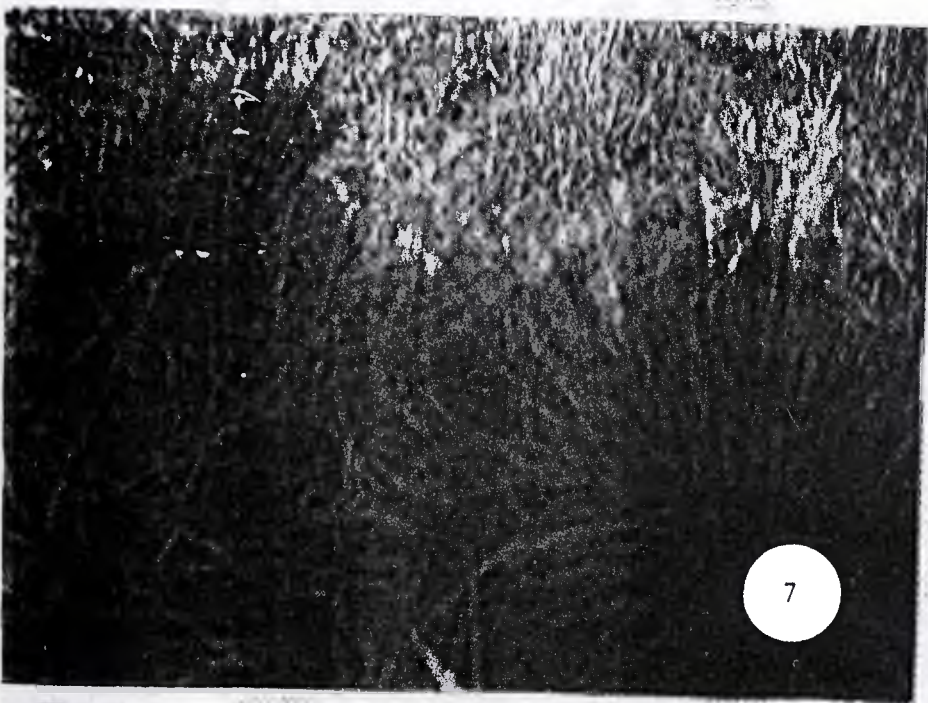
- |    |  |
|----|--|
| 1. | Run on diversion ditch at north side of landfill (SWMU 1). Note: photo discoloration is due to exposure of film. |
| 2. | Run on diversion ditch at south side of landfill (SWMU 2). Note flowing water in ditch.                          |
| 3. | Monitoring well protective casing (well B-5). Note vent structure in background.                                 |
| 4. | Monitoring wells at west side of landfill (SWMU 1).  |
| 5. | Former Ridgefield Brick and Tile Company operations building.  |
| 6. | Vegetated cover on landfill unit (SWMU 1).   |
| 7. | Vegetated cover on landfill unit (SWMU 1).   |



G-LINE #52584  
25MM PRINTS



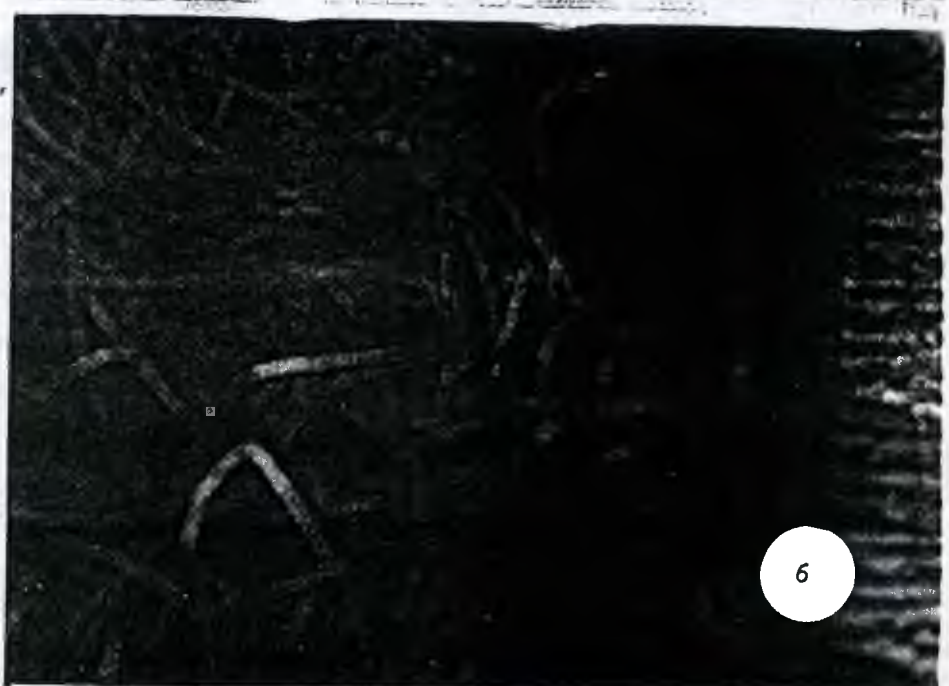




7



5



6



APPENDIX C  
VSI FIELD NOTES

3/19/92 - USI at Ridgefield Brick & Tile Landfill - Pacific Wood Treating Landfill

1000 - meet w/ Bryant Adams - PWT  
Tom Kuper - David J. Newton Assoc.

- 55°F, light rain  
kickoff - I go over purpose & scope of RFA process

we talk about history of site, 1983 closure  
monitoring done since closure

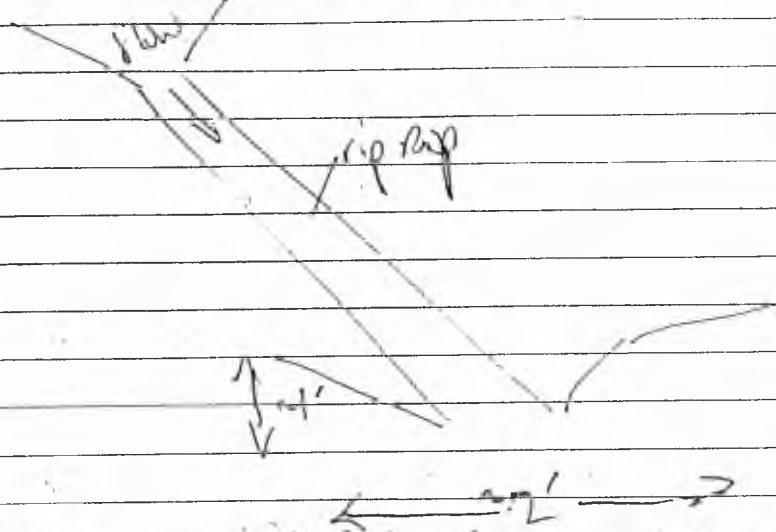
- drinking water wells
- 1/2 inch thick, not reliable
- "B" series monitoring wells

- site settling - clay excavated from pit,  
down to sand unit - sand layer pinches  
out to west → clay gradient  
Trandile is underneath - low permeability  
in top of unit due to weathering effects.

We start tour @ 1040

run on diversion - ditch system on east, North  
& south sides of landfill - ~1 foot deep  
~2' wide - has sump - in bottom.  
- moderate rain falling - flow observed  
in diversion ditches

diversion ditches



ditches maintained in good condition -  
 - no slumping, gullies or rills noticed

- check monitoring wells  
 seals & casings in good condition
- go to former Brick manufacturing building
  - all processes now gone - stopped operation many years ago - date unknown
  - building is empty except for some domestic possessions of Elmer Muffet (former owner of RBT) - old household appliances, etc



I ask about ownership / site history

Bryant Adams explains site was operated as a brick / tile manufacturing plant & clay pit until approx 1960s.

Asbestos was brought to site starting in 1979 - waste pile

closure performed in 1983 - underdrain liner and toe drain constructed, then wastes placed in fill & capped. problems w/ ground water monitoring due to seasonal perched water, permanent aquifer is 240' below land surface.

During closure - 1983 - property was purchased from Elmer Myffet by PWT - they wanted control of site during closure.

wrap up meeting - I ask for monitoring data, additional on closure & figures from geologic reports.

Then take photos

Photo 1 - run on diversion ditch - N side of L.F.

Photo 2 - South side of L.F. run on diversion ditch - flowing water - due to rain fall

Photo 3 - monitoring well B-5  
(vent in background)

Photo 4 - monitoring wells - west side  
of L.F.

Photo 5 - RBT building - called "the  
Bern"

Photo 6 - vegetation on LF cover

Photo 7 - vegetation on LF cover -

lv. side @ 1145



Apply to  
attn of: HW-106

SUBJECT: . **Comments on RPA for Pacific Wood Treating/Ridgefield  
Brick and Tile Landfill, Ridgefield, Washington**

DATE: May 15, 1992

FROM: Dawnee Dahm, RCRA Permits Section

TO: Stuart Strum, SAIC

Following are my comments regarding the Pacific Wood Treating/Ridgefield Brick and Tile Landfill RPA. If you have any questions, please contact me at 553-2867.

Page 3, LOCATION AND HISTORY

Provide more background on operations of Ridgefield Brick and Tile (RBT).

Page 3, HAZARDOUS WASTE MANAGEMENT

Please provide more indepth detail in regards to "the existing clay pit" that had been dug during operation of RBT. Was anything placed in it during RBT's operations or was it just a pit left from excavation of clay to make tiles?

Page 17, SWMU #2 - FORMER ASH STORAGE PILE

UNIT DESCRIPTION - Was the ash stored on the ground? Was it enclosed? Was the ash exposed to weather? Leachate analysis in landfill have shown contaminants, so therefore reasonable to assume that this pile also leached contaminants? Was any soil sampling performed?

Figure 2

This figure shows locations of a drain pipe, ditch, and culvert. These units appear to be connected to the former clay pit. Clarify whether these units were ever used for solid waste management, such as storm water or process waste water. If they were used for solid waste management, describe each units construction, dates of operation and wastes managed.

Other

Revise the facility description to include a discussion of materials stored and/or otherwise managed in the warehouse. Is the warehouse currently or previously used for storage of any solid wastes?



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attn of: HW-106

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DATE: May 15, 1992

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Science Applications International Corporation  
An Employee-Owned Company

**Technology Services Company**

WA 6906  
RFA  
7a  
WA 6906  
4.6.1992

April 6, 1992

DCN: TZ4-C10021-RN-10075

Received

APR 7 1992

SUPERINTENDENT BRANCH

Ms. Deborah Robinson  
U.S. Environmental Protection Agency  
Hazardous Waste Division (HW-112)  
1200 Sixth Avenue  
Seattle, Washington 98101

Re: EPA Contract No. 68-W9-0008, Work Assignment No. C10021, Pacific Wood  
Treating/Ridgefield/Brick and Tile Landfill RPA  
SAIC/TSC Project No. 6-788-03-1400-140

Dear Ms. Robinson:

Please find enclosed the draft RCRA Preliminary Assessment (RPA) report for the Pacific Wood Treating/Ridgefield Brick and Tile Landfill site located in Clark County, Washington.

Please feel free to contact Kathryn Gladden or myself at 206/485-2818 if you have any questions or comments regarding this report.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION  
Technology Services Company

Stuart Strum  
Hydrogeologist

Enclosure: As stated

cc: M. Bailey, EPA RCRA Site Manager  
M. Slater, EPA Region 10 RCRA EPI Coordinator (cover letter only)  
T. Tobin, SAIC/TSC RPM (cover letter only)  
K. Gladden, SAIC/TSC WAM (cover letter only)

RCRA PRELIMINARY ASSESSMENT  
PACIFIC WOOD TREATING/RIDGEFIELD BRICK AND TILE  
RIDGEFIELD, WASHINGTON  
EPA I.D. NO. WAD009036906

Prepared for:

U.S. Environmental Protection Agency  
1200 Sixth Avenue  
Seattle, WA 98101

Prepared by:

Science Applications International Corporation  
Technology Services Company  
18702 North Creek Parkway, Suite 211  
Bothell, WA 98011

EPA Contract No. 68-W9-0008  
Work Assignment No. C10021  
SAIC/TSC Project No. 6-788-03-1400-140

April 1992

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## 1.0 INTRODUCTION

### 1.1 PURPOSE AND SCOPE OF THE RFA PROGRAM

The 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) provide authority to the Environmental Protection Agency (EPA) to require comprehensive corrective action on all solid waste management units (SWMUs) and other areas of concern (AOCs) at interim status hazardous waste management facilities where a release(s) of hazardous constituents has occurred. This includes RCRA interim status facilities, those applying for Part B permits, and those undergoing closure. The intent of this authority is to address previously unregulated constituents released to air, surface water, ground water, and soil and the generation of subsurface gases.

A major activity of the EPA's corrective action program consists of a RCRA Facility Assessment (RFA). According to the EPA's RCRA Facility Assessment Guidance Document (1), the purposes of an RFA are to:

1. Identify and gather information on releases at RCRA-regulated facilities
2. Evaluate SWMUs and AOCs for releases to all media, and regulated units for releases other than to ground water
3. Make preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility
4. Screen from further investigation those SWMUs which do not pose a threat to human health and the environment

The three basic steps of a RFA consist of a preliminary review (PR) of existing files and other generally available or requested information, a visual site inspection (VSI) to confirm and/or obtain additional information on past or present releases, and when warranted, a sampling visit to fill data gaps by obtaining field and analytical data.

### 1.2 REPORT CONTENTS

This report provides the results of the RCRA Preliminary Assessment (RPA) performed at the Pacific Wood Treating/Ridgefield Brick and Tile (PWT/RBT) Landfill site in Clark County, Washington. The RPA report combines the requirements of a RFA and a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment (PA). Primary sources of information utilized in this report include files and correspondence of EPA Region 10 and the Washington Department of Ecology (Ecology), additional information provided by the facility and observations made during the VSI. The VSI was conducted on February 20, 1992 by Stuart Strum of Science Applications International Corporation/Technology Services Company.

Section 2.0 of this report describes the PWT/RBT site and its operations. Information pertaining to the environmental setting is presented in Section 3.0. Section 4.0 provides a description of SWMUs and AOCs identified in the course of the assessment. The discussion of each SWMU and AOC includes available information on unit description, period of operation, wastes managed, release controls, release history, and information obtained during the VSI.

## 2.0 FACILITY DESCRIPTION

### 2.1 LOCATION AND HISTORY

The Pacific Wood Treating/Ridgefield Brick and Tile (PWT/RBT) Landfill site is located two miles northeast of Ridgefield, Washington on 289th Street in the northeast 1/4 of the southeast 1/4 of section 17, T4N R1E (Figure 1). The facility is a closed landfill that has been used for disposal of hog fuel boiler ash generated at the PWT facility located in Ridgefield, Washington. (6,8)

→ Different location?

Prior to the disposal activities by PWT, the site had been operated as a brick and ceramic tile manufacturing facility under the name Ridgefield Brick and Tile Company. The property and the manufacturing operation were owned by Elmer Muffet. Manufacturing operations at the site had ceased prior to disposal of wastes by PWT. Beginning in 1979, boiler ash from the PWT facility in Ridgefield was disposed at the site, along with solid wastes including wood wastes, tree stumps, scrap timber, and other solid wastes. PWT agreed to close the disposal area by draining the (former clay pit) at the site, constructing a liner, underdrain and toe drain system, placing the waste in the pit, and capping the landfill. PWT purchased the property from Elmer Muffet in 1983 during the closure activities. (3,8,15)

- Any haz. subst. concerns?

### 2.2 IDENTIFICATION OF SOLID WASTE MANAGEMENT UNITS

During the course of this assessment, two SWMUs were identified. These units are the landfill (SWMU 1) and the former ash storage pile (SWMU 2). Locations of the SWMUs are shown on Figure 2.

### 2.3 HAZARDOUS WASTE MANAGEMENT

Ash generated in the hog fuel boiler at the PWT Ridgefield Plant was stored in the former waste storage pile (SWMU 2) and was disposed in the landfill (SWMU 1) at the PWT/RBT site from 1979 until January 4, 1983. The boiler fuel was woodwaste from the wood treating facility. Waste water treatment at the PWT Ridgefield Plant generated sludges from treatment of copper chrome arsenic (CCA) and pentachlorophenol (PCP) wastes that are listed hazardous wastes (K001). The waste water treatment sludges were sprayed onto wood used as fuel in the boiler and was incinerated. This process resulted in the boiler ash being designated as K001 waste due to the "derived from" standard for listed hazardous wastes. Because the facility was unaware of the regulatory status of the boiler ash until 1983, when an enforcement order was issued by Ecology, the ash was managed as a solid waste and was stored in the former waste pile for disposal at the landfill unit. The excavation for the landfill was the existing clay pit that had been dug during operation of the Ridgefield Brick and Tile Company at the site. Upon receipt of the order, PWT developed and implemented the closure of the landfill by constructing the underdrain, liner and toe drain system, moving the ash from the waste pile into the landfill, and capping the unit. Due to the geologic

What is the ash?

Describe what was

done to drain the clay pit. Haz subst?

Wash ash in the LF prior to this upgrade?



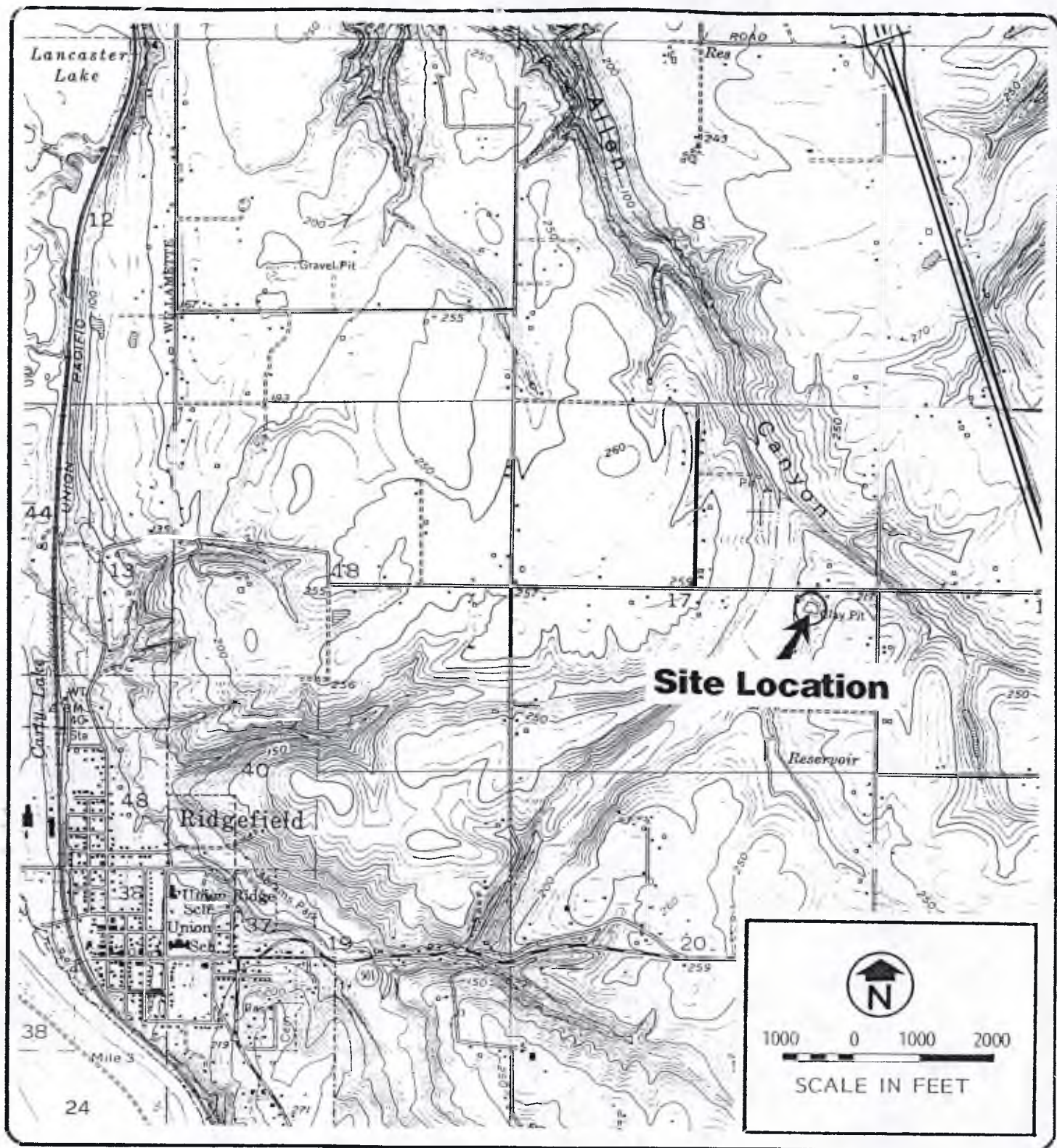


Figure 1

SITE LOCATION MAP  
 PACIFIC WOOD TREATING/RIDGEFIELD BRICK AND TILE LANDFILL  
 RIDGEFIELD, WASHINGTON  
 Source: Reference 6

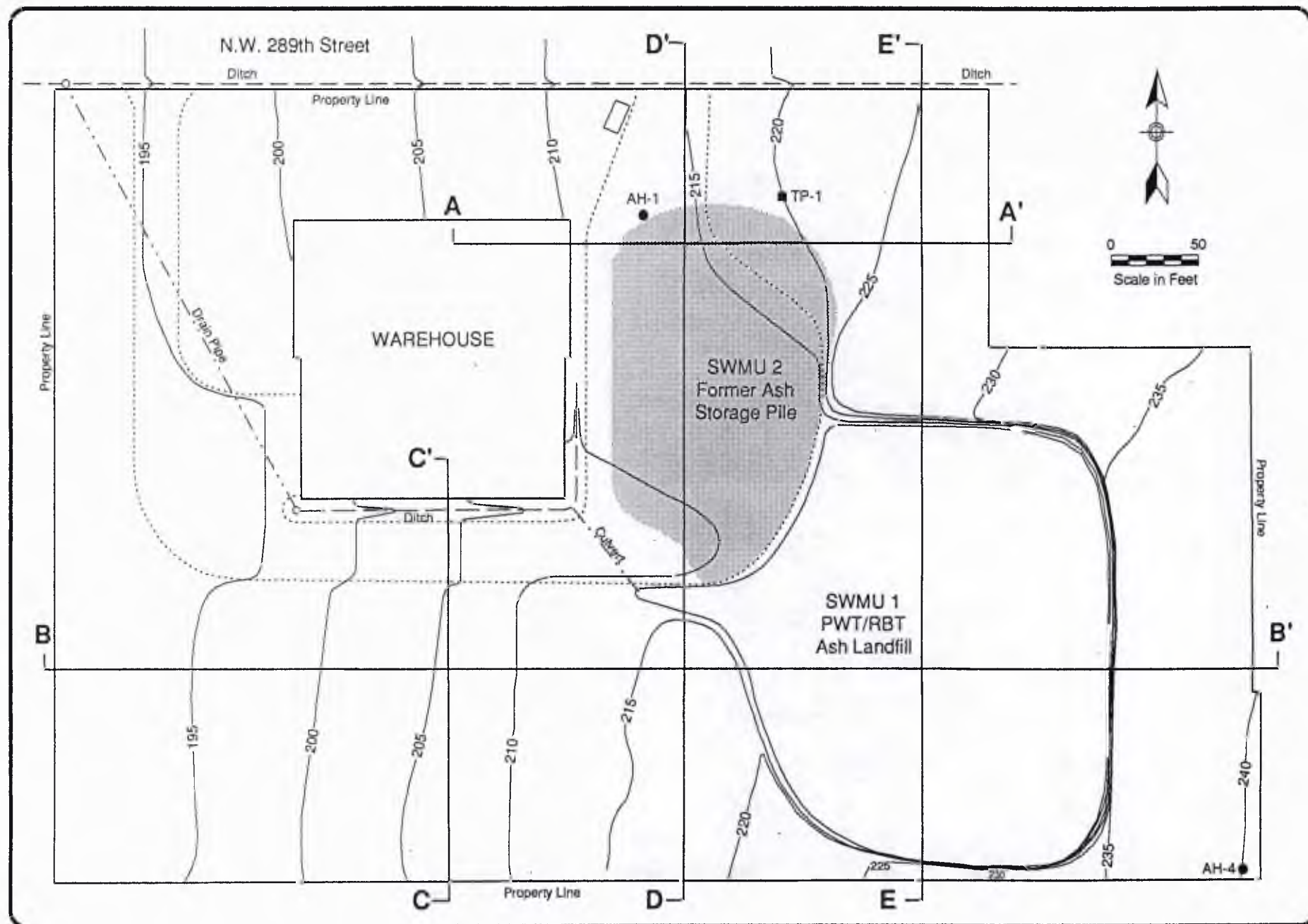


Figure 2

LOCATION OF SOLID WASTE MANAGEMENT UNITS AT THE PWT/RBT SITE



7  
setting of the unit, PWT attempted to implement ground water monitoring by sampling and analysis of the underdrain discharge, and by installation of piezometers. Leachate collected in the toe drain flows to a collection tank. Drummed leachate is shipped to a commercial TSD as K001/D004 waste. (3,8,9,14,15)

## 2.4 REGULATORY HISTORY

### 2.4.1 RCRA Notification and Permit History

Pacific Wood Treating filed a Notification of Hazardous Waste Activity for generation, treatment, and storage of wood treating wastes at the Ridgefield Plant on November 8, 1980. Because PWT had not identified the sludge derived boiler ash as a hazardous waste, the landfill ash disposal was not included in this notification. PWT submitted a Part A permit application for the RBT landfill unit (SWMU 1) on May 26, 1983. An initial notification of dangerous waste activity was filed with Ecology on April 1, 1985. (8,9)

The Part B permit application for the PWT/RBT site was called in on April 9, 1985 with a due date of October 11, 1985. A Consent Agreement between the facility and EPA dated November 21, 1986 required the Part B to be submitted. The agreement also required the facility to submit an approvable closure plan, including ground water monitoring requirements. A 3008(a) Compliance Order was issued by EPA on September 27, 1989 requiring submittal of the Part B within 90 days. The file materials reviewed did not include a Part B permit application for the PWT/RBT facility. (22,23)

### 2.4.2 RCRA Interim Status Compliance History

Two RCRA CEIs and one Comprehensive Monitoring Evaluation (CME) have been performed at the PWT/RBT site. The April 25, 1985 CEI conducted by Ecology documented that the facility did not comply with interim status financial assurance requirements. The June 10, 1987 CEI conducted by EPA documented that the facility had no waste analysis plan and no warning signs posted on the fence around the landfill. (11,24)

Ecology notified PWT that the landfill was a regulated unit and that closure would be required in Notice of Penalty No. DE 83-284, issued on June 20, 1983. The Closure Plan was submitted by the facility on July 15, 1983 and the Certification of Closure Report was submitted on February 15, 1984. The CME performed on June 12, 1984 determined that the monitoring of nearby domestic wells did not comply with the interim status ground water monitoring requirements of 40 CFR 265 Subpart F and the post closure monitoring requirements because this monitoring system could not immediately and reliably detect a release of hazardous waste or hazardous constituents from the unit. The ground water monitoring program currently in place at the facility has not been approved by EPA. (4,10,11,24)

### 3.0 ENVIRONMENTAL SETTING

#### 3.1 LOCATION AND SURROUNDING LAND USE

The PWT/RBT Landfill site is located in the northeast 1/4 of the southeast 1/4 of section 17, T4N R1E, at approximately 122°42'19" longitude and 45°49'50" latitude. The site is located in the "Fourth Plains" upland area between the floodplain of the Columbia River to the west and the foothills of the Cascade Mountains to the east. Adjacent land uses include agricultural land (pasture and crop production) and rural residential. Residential and commercial areas of the town of Ridgefield are two miles southwest of the site.(6,25)

The PWT/RBT Landfill site is currently inactive, no workers are present on-site. The nearest individual to the site is at a residence approximately 100 feet west of the facility. Population within four miles of the site is distributed as follows:

- 0 - 0.25 mile: 12
- 0.25 - 0.5 mile: 20
- 0.5 - 1 mile: 234
- 1 - 2 miles: 300
- 2 - 3 miles: 1,697
- 3 - 4 miles: 300

(references: 6,15,25)

#### 3.2 METEOROLOGY

The PWT/RBT site is located adjacent to the Columbia River Valley, west of the Cascade Mountains. This area has a maritime climate, characterized by wet, cool winters and mild, dry summers. The average temperature ranges from 38°F in January, to 64°F in July. The average annual temperature is 51°F. Total annual precipitation is 39 inches, and net annual precipitation is 19 inches. Average monthly precipitation ranges from 0.5 inches in July to 7.1 inches in December. The two-year 24-hour precipitation is 2.3 inches.(16,26)

#### 3.3 SURFACE HYDROLOGY

The site does not lie within the 100 year floodplain of the any of the nearby drainages. Surface drainage is relatively good because the ground surface has a slope of 8 per cent across the site. The drainage from the site is towards the northwest, discharging into the unnamed stream that flows into Mud Lake and eventually, the Lewis River. The upgradient drainage area is approximately 30 acres, due to the location of the site on the flank of a hill that acts as a drainage divide to the small tributary that drains the site area.(6)

There are approximately 450 acres of wetlands within four miles of the site, and four linear miles of wetland exposure have been mapped downstream from the site.(28)

Surface soils at the site are silt loams of the Gee series. These soils are moderately permeable and with good drainage. Runoff is slow from this soil type.

No surface water intakes for drinking water downstream of the facility have been identified. Upstream irrigation intakes are used to withdraw water from the East Fork of the Lewis River in this portion of Clark County.(16,17,18)

The Lewis and Columbia Rivers are used extensively for both sport and commercial fishing. They are also migration pathways for salmon that spawn upstream in the Columbia and Lewis River drainage basins.(21)

### 3.4 GEOLOGY AND GROUND WATER HYDROLOGY

The PWT/RBT site is located in the "Fourth Plains" terrace of southwestern Washington, between the alluvial valley of the Columbia River to the west and the foothills of the Cascade Range to the east. The site is underlain by unconsolidated Quaternary sediments of alluvial and deltaic origin. The unconsolidated deposits are underlain by the Pliocene Troutdale Formation in this portion of Clark County, and the Troutdale Formation is exposed in the valley of the unnamed creek west of the PWT/RBT site. The Troutdale Formation is comprised of an upper gravel member and a lower sand and silt member. Sand interbeds in the lower member of the Troutdale formation serve as the primary water supply in the vicinity of the PWT/RBT site (Figure 3). Older consolidated rocks underlying the Troutdale Formation are Eocene to Miocene volcanic and sedimentary rocks. These formations do not serve as significant aquifers in western Clark County due to the depths (several hundred feet below land surface) and low yields of these units.(2,3,4,5,17,19,20)

Subsurface soil samples collected at the site from the unconsolidated Quaternary sediments have been classified as stiff silty clay, silty micaceous sand and well sorted sand. This unit is up to 40 feet thick at the site, and the silty clay overlies the sand interval at the eastern side of the site. The lower sandy interval thins to the west, and pinches out west of the landfill (Figures 3,5,6). The excavation for the landfill was formed during quarrying of the silty clay for brick and tile manufacturing. The bottom of the excavation is at the top of the sand interval; the downward advancement of the pit was halted at the clay - sand contact.(3,4,5,10)

The Troutdale Formation of Pliocene age underlies the Quaternary sediments across the site and adjacent areas. The upper portion of the Troutdale Formation penetrated by borings at the site is a silty sandy gravel. The gravel clasts of the conglomerate beneath the upper contact have been weathered to clay. The weathering of rock clasts in the upper portion of the Troutdale Formation is common in the area, often resulting in a significant increase in the clay content due to post depositional alteration of the gravels. The alteration of the gravels of the uppermost Troutdale Formation at the site has reduced the hydraulic conductivity to less than  $10^{-5}$ cm/sec.(2,10)

During the closure of the landfill, the facility attempted to establish a monitoring network by sampling existing domestic wells at adjacent properties to the east, north and west of the site. After EPA found that this approach did not

Pit led ash in a pit that was cut through the clay layer.



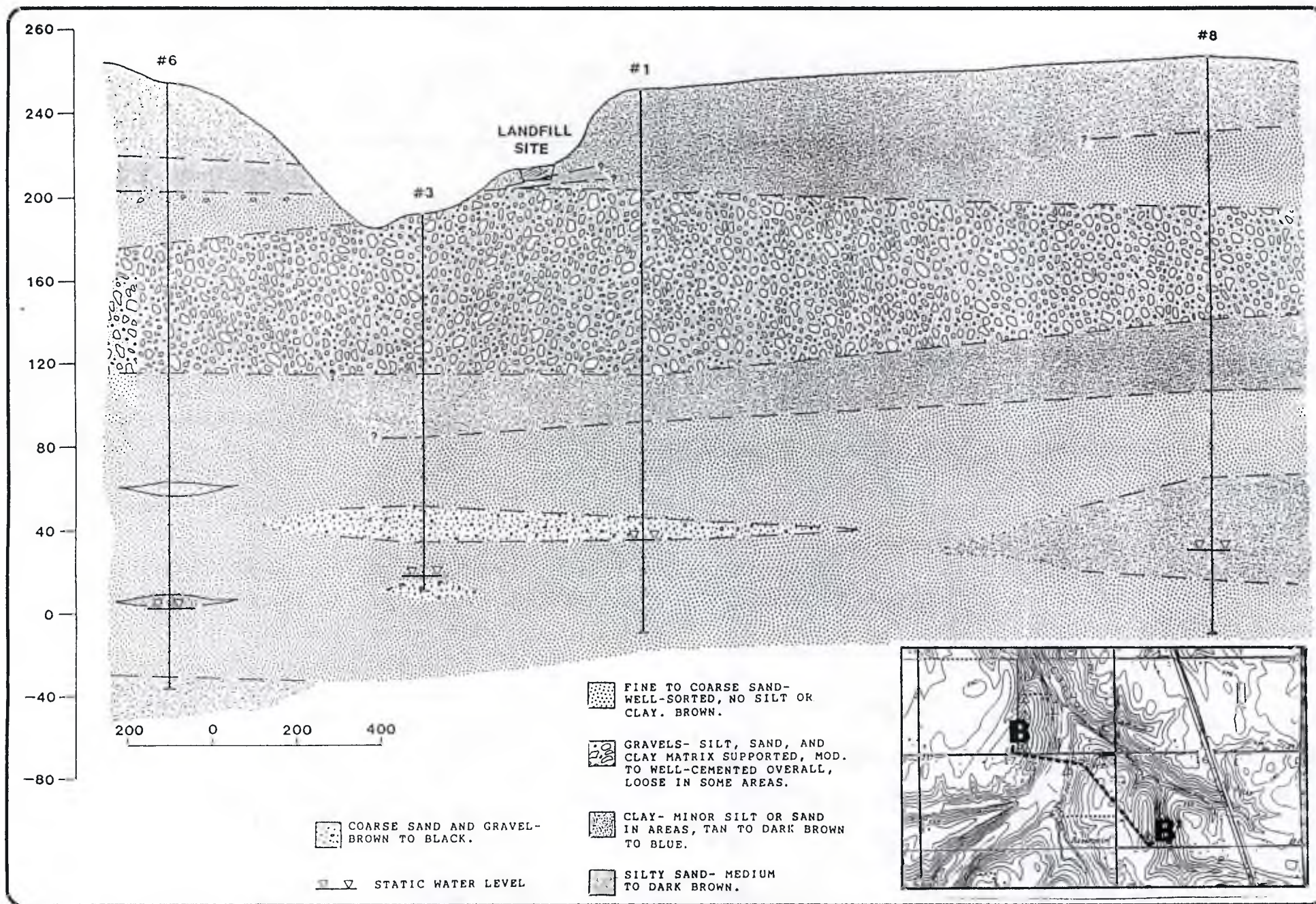


Figure 3

REGIONAL GEOLOGIC CROSS SECTION OF THE PWT/RBT SITE

Source: Reference 14



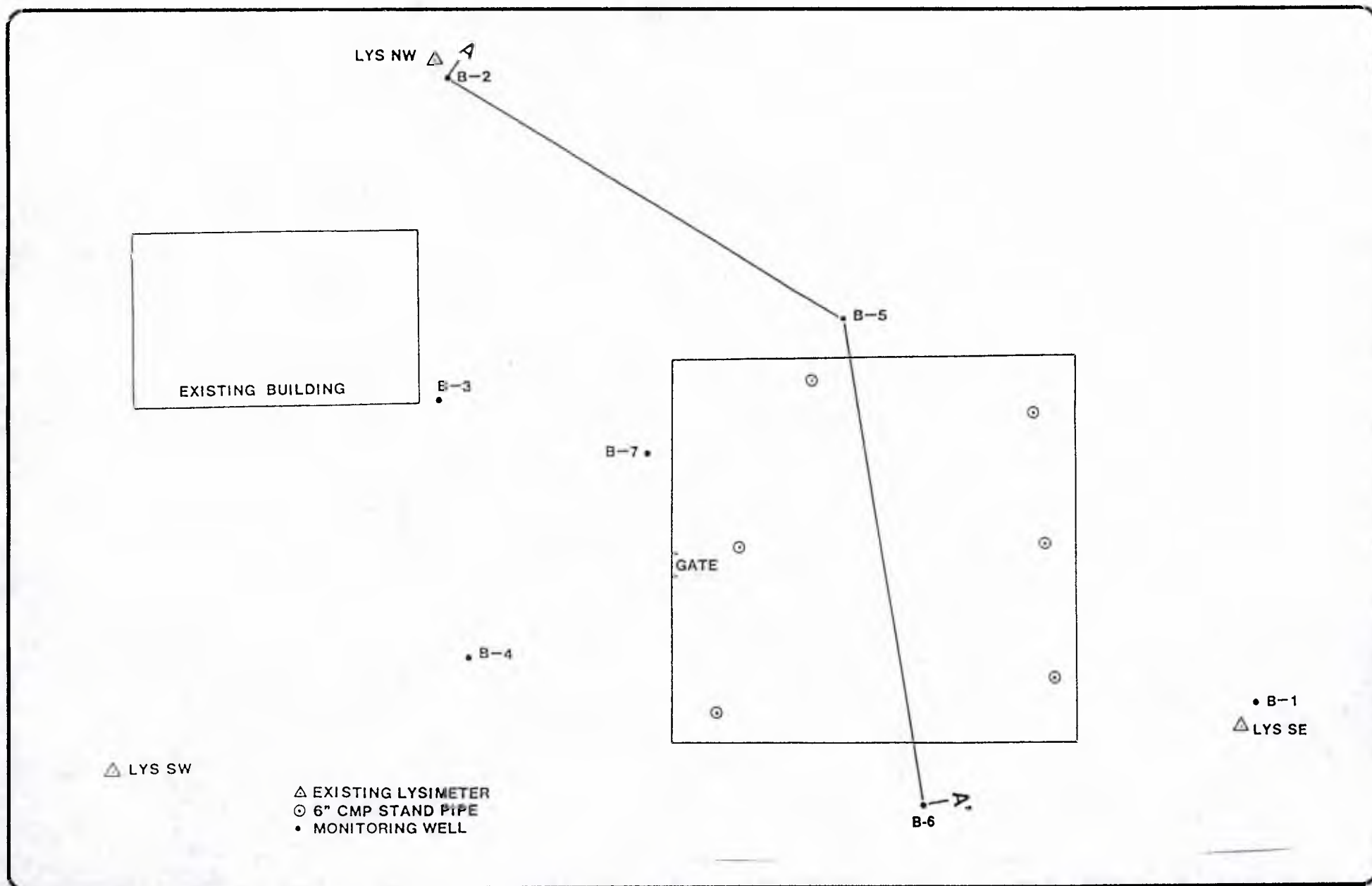


Figure 4

MONITORING WELL AND CROSS SECTION LOCATIONS  
 PWT/RBT LANDFILL SITE

Source: Reference 14

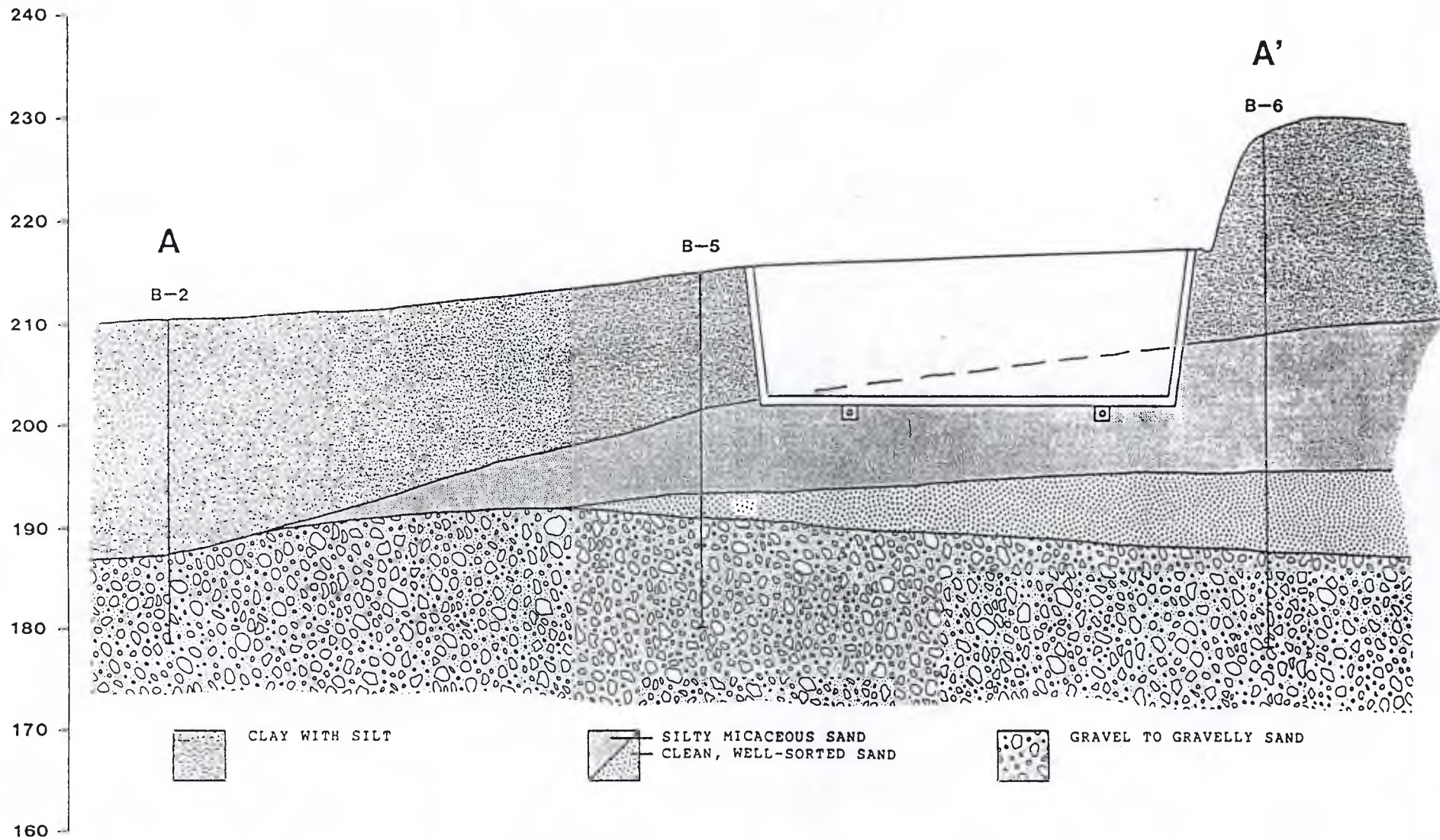


Figure 5

CROSS SECTION OF THE PWT/RBT LANDFILL SITE

Source: Reference 14

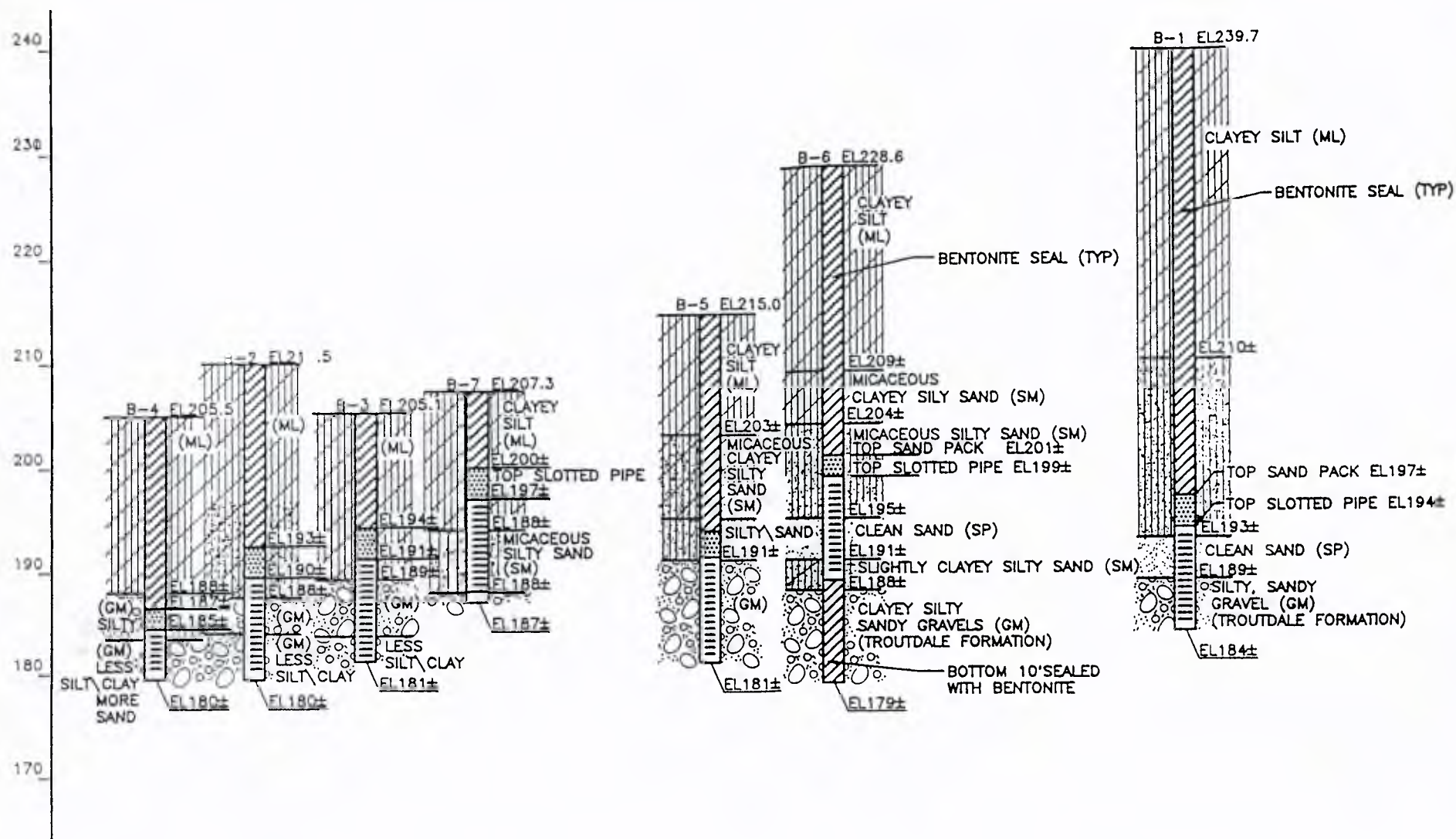


Figure 6

ILLUSTRATION OF MONITORING WELLS  
 RIDGEFIELD BRICK AND TILE SITE, RIDGEFIELD, WASHINGTON  
 Source: Reference 14



meet the regulatory requirements for a monitoring system to immediately detect releases from the unit, a series of lysimeters and monitoring wells were installed around the landfill. Site specific monitoring was attempted by installation of lysimeters in the sand layer at the landfill, due to the absence of saturated conditions in the sand layer except during late winter or early spring wet conditions. The lysimeters failed and could not be used to reliably sample the sand interval during unsaturated conditions.(3,4,5,7,10)

In August of 1987, seven monitoring wells were installed at the landfill. The wells were completed with screened intervals placed in the sand present in the lower portion of the unconsolidated sediments, except where the sand is absent to the west of the landfill. Monitoring well completions are illustrated in Figure 4. Where the sand was not present, the monitoring wells were completed in the uppermost portion of the Troutdale Formation. Water level monitoring conducted in the newer monitoring wells indicated that the lowermost part of the sand unit beneath the landfill (up to one foot thick) is ephemerally saturated during wet season conditions. Because the monitoring wells have been constructed with the sand pack interval across the contact between the Troutdale Formation and the overlying Quaternary sediments, the horizontal flow direction in the sand unit and the hydraulic relationship with the Troutdale can not be determined from available information. Toe drain leachate analyses detected hazardous constituents associated with the wastes in the landfill, including arsenic pentachlorophenol; however, hazardous constituents (arsenic) have been detected in ground water samples only in very low (9 ug/liter) concentrations (see section 3.6).

Ground water use within four miles of the facility is distributed as follows:

- 0-0.25 mile: 12
- 0.25-0.5 mile: 6
- 0.5-1 mile 15
- 1-2 miles: 175 (217 acres irrigated by wells)
- 2-3 miles: 1,504 (the City of Ridgefield operates water supply wells in this distance interval)
- 3-4 miles: 56

The nearest water supply well to the site is the Steve Randall well located approximately 200 feet east of the site.(3)

### 3.5 CRITICAL HABITATS/ENDANGERED OR THREATENED SPECIES

The Ridgefield National Wildlife Refuge is located adjacent to the Columbia River two miles southwest of the facility. The wildlife refuge is upstream of the confluence of the Lewis and Columbia Rivers, and is not downstream of the facility.(27)



### 3.6 SITE MONITORING DATA

Ground water monitoring has been attempted through the implementation of three systems at the site since 1983. In response to the Complaint and Compliance Order from Ecology to close the landfill as a regulated land disposal unit, PWT initiated a monitoring program for existing domestic wells around the facility. EPA determined that this approach did not meet the requirements for a ground water monitoring system as required under 40 CFR 265 Subpart F, and instructed the facility to develop a site-specific monitoring program. Due to uncertainties associated with the present monitoring system, including insufficient data to determine ground water flow direction beneath the landfill and hydraulic relationship between the alluvial sediments and the Troutdale Formation, the characterization of site hydrogeology has not clearly determined the ground water flow direction.(3,4,13)

In addition to samples from monitoring wells, the toe drain has been sampled and analyzed to characterize leachate from the landfill and the underdrain has been sampled to determine the quality of ground water discharged from beneath the liner through this system. Hazardous constituents included in the analyses performed have included metals, pentachlorophenol, and PAHs. While some hazardous constituents have been detected in ground water at the site, the concentrations present do not indicate a significant release has occurred from the landfill that could be attributed to a plume of contamination, or that approaches MCLs or other health-based water quality criteria. The results of the monitoring program are summarized in Appendix A.

#### 4.0 DESCRIPTION OF INDIVIDUAL UNITS

Two SWMUs were identified and evaluated at the PWT/RBT Landfill site (Figure 2). The following sections provide descriptive and historical information on each SWMU, including an evaluation of their release potentials to all media of concern.

##### 4.1 SWMU 1 - ASH LANDFILL

###### 4.1.1 Information Summary

Unit Description: SWMU 1 is a landfill that was constructed for disposal of hog fuel boiler ash generated at the PWT facility in Ridgefield, Washington. The unit contains a total of 28,000 cubic yards of waste, including up to 240 tons of bottom, multi-cone, and baghouse ash designated as D004 and K001 wastes due to the arsenic concentration of the ash and waste water treatment sludge fed to the boiler.(8)

Dates of Operation: Construction of containment, including the underdrain, liner and toe drain systems was performed in 1983 and waste was placed in the landfill during the fall of 1983. Final closure of the unit was certified in February 1984, and wastes are still present in the disposal unit.(4)

Wastes Managed: The wastes present in the unit include bottom, multi-cone, and baghouse ash designated as D004 and K001 waste due to the arsenic concentration of the ash and the waste water treatment sludge fed to the hog fuel boiler. Other wood wastes, including log yard wastes and tree stumps, were also disposed at the site.(3,8)

Release Controls: The unit was constructed with an underdrain system, a clay liner, a leachate collection system (toe drain), gas vents, a clay cap, a vegetated soil layer over the cap and gas vents. Run on is diverted from the site in run on control ditches around the north, east, and south sides of the unit. The toe drain and underdrain lines are PVC drain lines in gravel drainage trenches located above and below the liner. The liner was constructed of a four inch thick layer of compacted soil amended with bentonite placed above a 1.5 foot thick compacted soil layer. The cap is a 1.5 foot compacted soil layer. All compacted soil used in landfill construction was compacted to greater than 90 per cent relative compaction. The unit is surrounded by a three-strand barbed wire fence to prevent access.(4,15)

History of Releases: Monitoring data collected from lysimeters, drains, and monitoring wells have not detected any significant releases from the unit. Air releases have not occurred from the unit due to the absence of volatile hazardous constituents and the presence of the cap. Surface soil and surface water releases have not occurred due to the presence of the cap and the diversion of runoff around the unit in the diversion ditches.

#### 4.1.2 Conclusions

Monitoring data collected at the landfill and observations made during the VSI do not provide any evidence of significant releases to ground water from the unit. The diversion of run on around the unit and the presence of a maintained cover preclude the possibility of releases to surface water, surface soil or air. The ground water monitoring data available at the unit do not indicate that ground water contamination has occurred at the site.

Due to the placement and construction of the wells and the presence of ground water in the shallow sand unit, the direction of ground water flow and relationship between the sand unit and the uppermost Troutdale Formation have not been demonstrated. The monitoring program should be revised by abandoning wells screened in both units and installing wells that monitor the two zones to allow at determination of the hydraulic relationships at the unit to provide for reliable monitoring at the landfill. It is not anticipated that contamination warranting further investigation will be detected by this modified monitoring program; however, these modifications are needed to meet the requirements of closure under interim status and issuance of a closure permit.

## 4.2 SWMU 2 - FORMER ASH STORAGE PILE

### 4.2.1 Information Summary

Unit Description: SWMU 2 was operated as a storage pile at the facility where boiler ash (K001 and D004) and wood wastes were stored at the site until the landfill cell was constructed and the wastes were placed in that unit.(3,4,8,9)

Dates of Operation: Wastes were stored in the waste pile from December of 1979 until the wastes were moved to the landfill during the closure operation in October, 1983.(4)

Wastes Managed: The wastes stored in the unit included bottom, multi-cone, and baghouse ash designated as D004 and K001 waste due to the arsenic concentration of the ash and the waste water treatment sludge fed to the hog fuel boiler. Other wood wastes, including log yard wastes and tree stumps were also stored in the waste pile.(3,8)

Release Controls: No release controls for this unit were identified in the file information.

History of Releases: No evidence of releases from the waste pile were identified in the file information or from observations made during the VSI.

### 4.2.2 Conclusions

Due to the removal of all wastes from the unit in 1983 during the closure of the landfill, and the absence of any contamination detected at the facility that could be attributed to the waste pile, the potential that releases have occurred from this unit is judged to be low.

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APPENDIX A  
SITE MONITORING DATA

TOE DRAIN LEACHATE ANALYSES  
(concentrations in ug/l)

Analyte	Sample Date														
	12/20/83	1/11/84	3/26/84	6/12/84	12/12/84	2/27/86	2/27/86	12/23/8	1/8/87	1/29/87	3/16/87	5/23/88	1/12/90	6/4/90	3/28/91
	(duplicate)														
Naphthalene	10	5	5U	0.1U	1U	4.9	6.1	0.5	3	10U	15U	10U	1U		1U
Phenol														1U	
Pentachlorophenol	0.6	1.3	2.7	0.1U	0.8	1.1	1U	1U	1.5	1U	1U	0.3	1U	1U	5U
Benz(a)anthracene														5U	1U
Benzo(a)pyrene														5U	1U
Dibenz(a,h)anthracene												0.05U	3U	5U	2U
Arsenic	9	5U	8	5U	5U	5U	5U	5U	5U	5U	5U	6	5U		5U
Chromium											5U	8U	5U	1.5	5U

No value: analysis not performed

U: analyte not detected at the reporting limit

Ground Water Monitoring Data  
PWT/RBT Landfill Site  
(concentrations in ug/l)

Sample Date	1/12/90			11/20/92		3/28/91			4/9/91	
Monitoring Well	B-1	B-4	B-5	B-4	B-5	B-4	B-5	B-6	B-1	B-3
Analyte										
Naphthalene				1U	1U	1U	1U	1U	1U	1U
Pentachlorophenol	0.1U	0.1U	0.1U	5U	5U	5U	5U	5U	5U	5U
Benz(a)anthracene	3U	3U	3U	1U	1U	1U	1U	1U	1U	1U
Benzo(a)pyrene	3U	3U	3U	1U	1U	1U	1U	1U	1U	1U
Dibenz(a,h)anthracene	3U	3U	3U	2U	2U	1U	1U	1U	1U	1U
Arsenic	5U	7	5U	5U	5U	5U	5U	5U	5U	5U
Chromium	5U	5U	5U	10U	10U	5U	5U	5U		

No value: analysis not performed

U: analyte not detected at the reporting limit

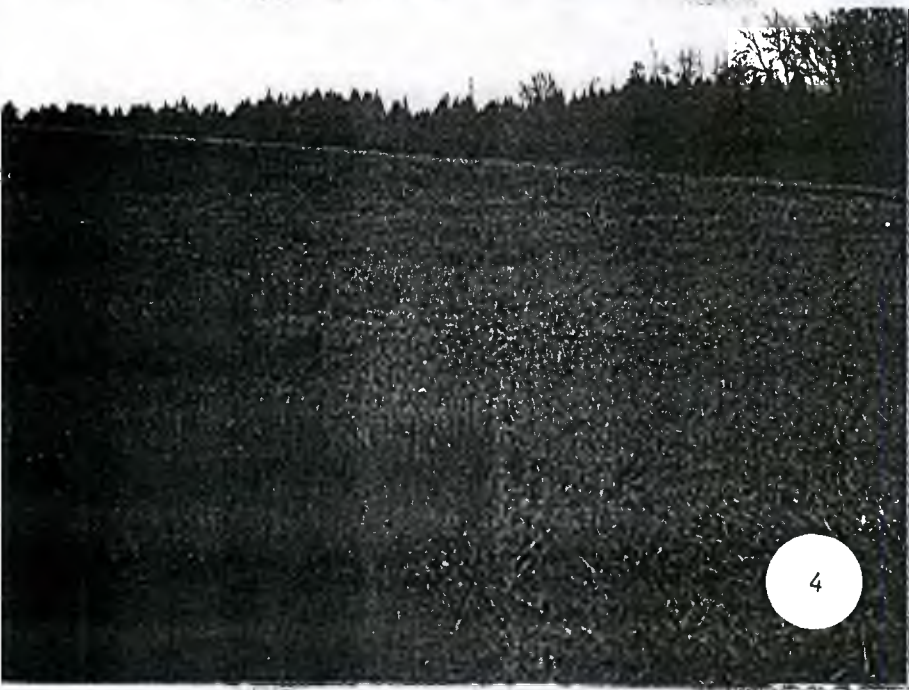
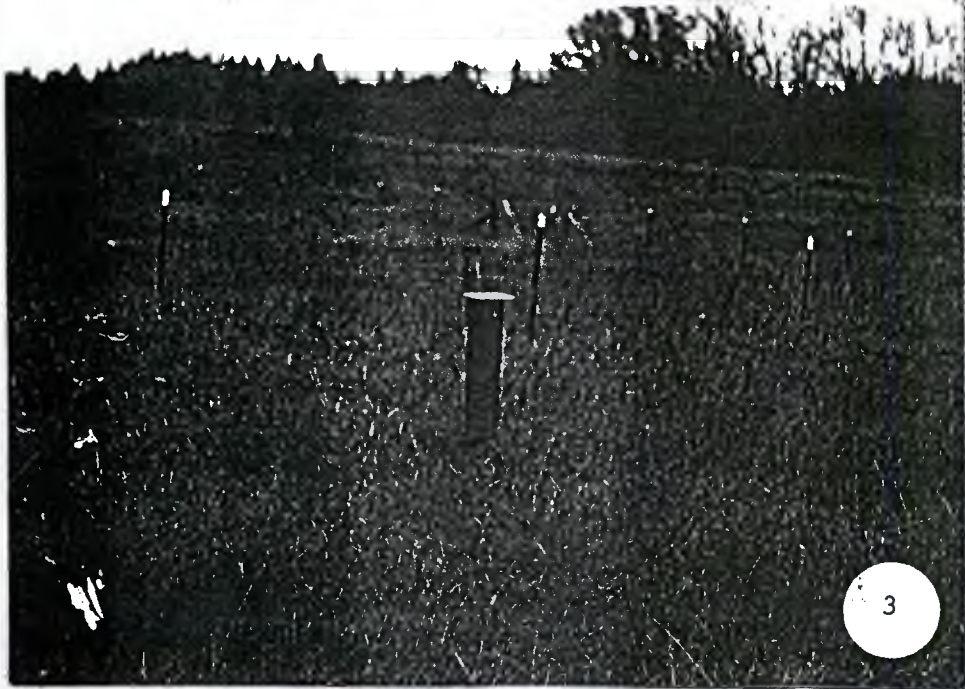
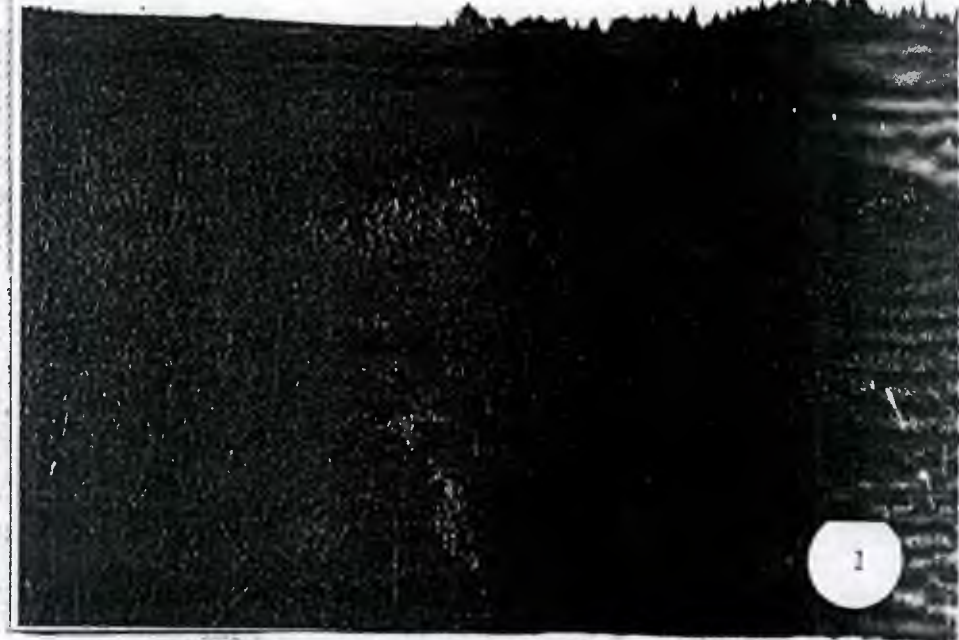


APPENDIX B  
VSI PHOTOGRAPH LOG

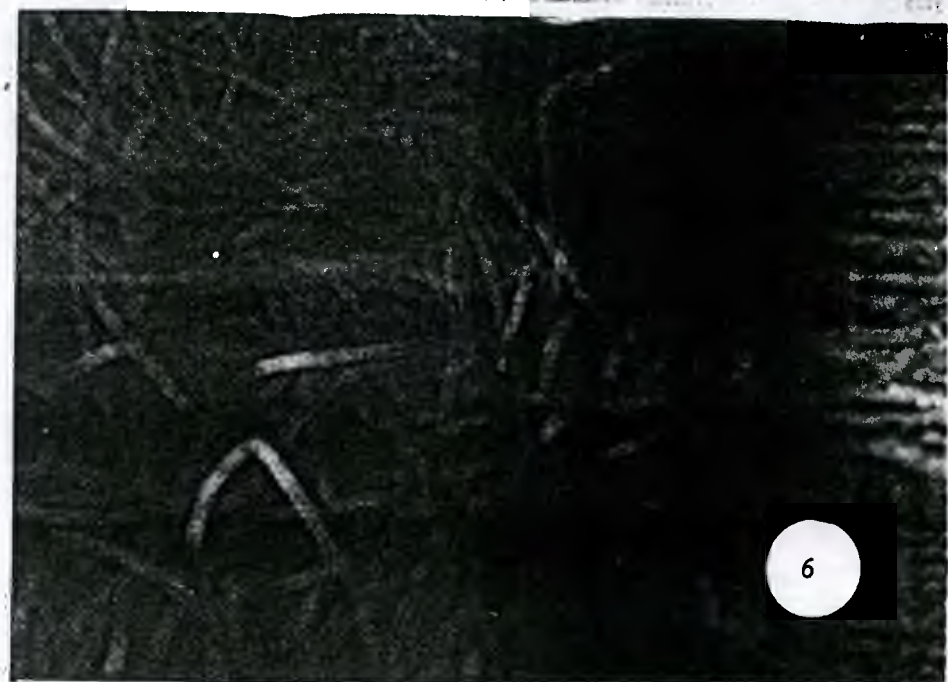
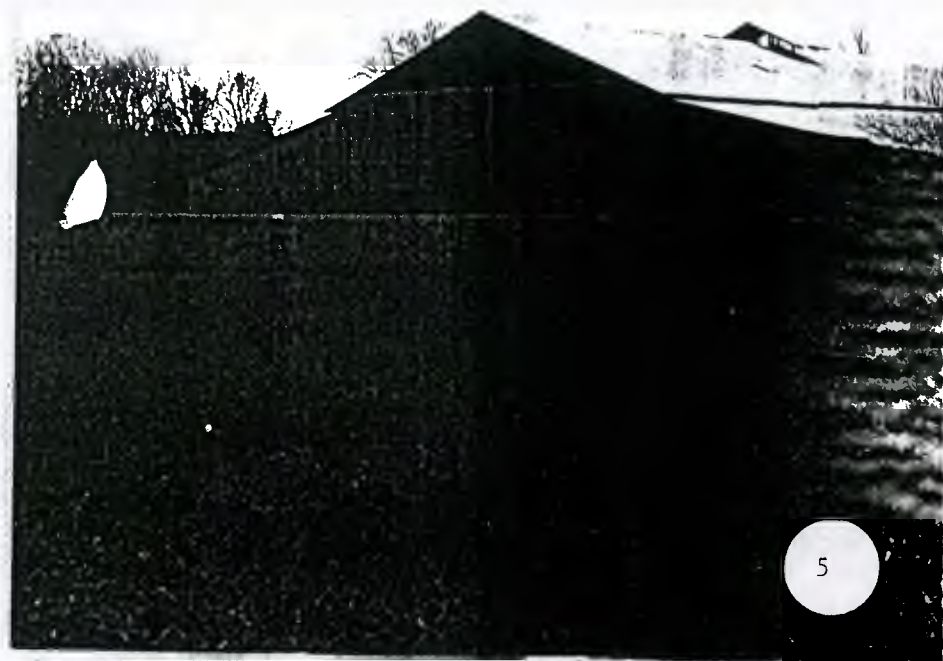
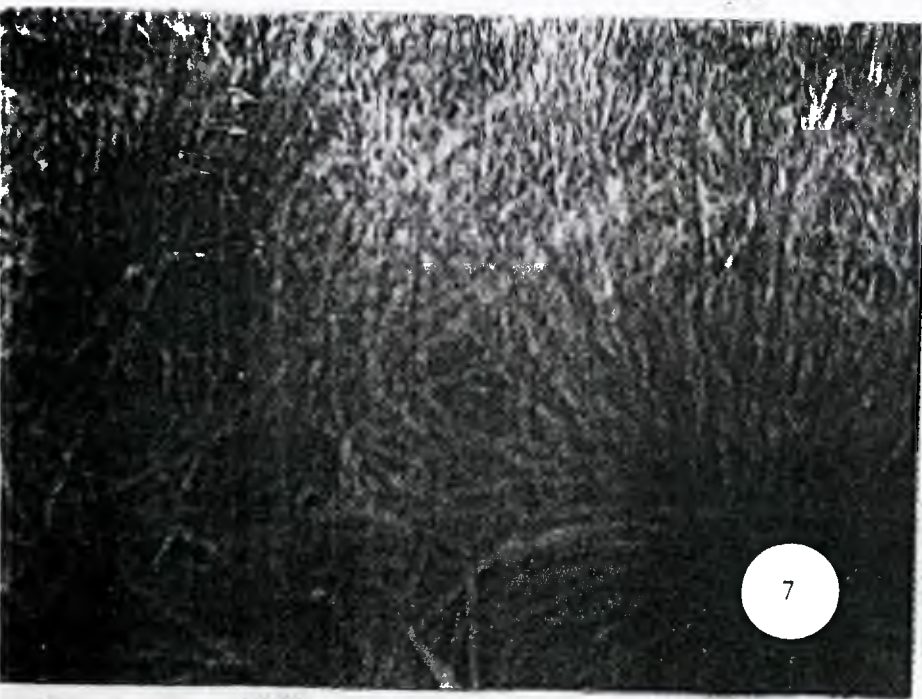
<u>Photo No.</u>	<u>Description</u>
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- |    |  |
|----|--|
| 1. | Run on diversion ditch at north side of landfill (SWMU 1). Note: photo discoloration is due to exposure of film. |
| 2. | Run on diversion ditch at south side of landfill (SWMU 2). Note flowing water in ditch.                          |
| 3. | Monitoring well protective casing (well B-5). Note vent structure in background.                                 |
| 4. | Monitoring wells at west side of landfill (SWMU 1).  |
| 5. | Former Ridgefield Brick and Tile Company operations building.  |
| 6. | Vegetated cover on landfill unit (SWMU 1).   |
| 7. | Vegetated cover on landfill unit (SWMU 1).   |

CLINE #52584  
35MM PRINTS









APPENDIX C

VSI FIELD NOTES

3/19/52 - VST at Ridgefield Bricks Bld Landfill - Pacific Wood Treating Landfill

1000 - meet w/ Bryant Adams - PWT  
Tom Kuper - David J. Newton Assoc.

- 55°F, light rain

Kickoff of T. go over purpose & scope of RFA process

we talk about history of site, 1983 closure  
monitoring done since closure

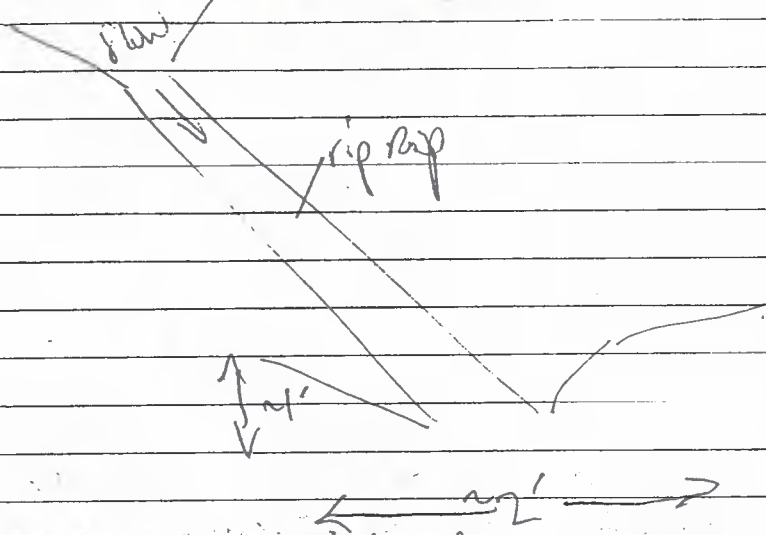
- drinking water wells
- 1/2 inch failed, not reliable
- "B" series monitoring wells

- site settling - clay excavated from pit,  
down to sand unit - sand layer pinches  
west to west → clay on gradient of  
Trundle is underneath - low permeability  
in top of unit due to weathering effects.

We start rain @ 1040

run a diversion - ditch system on east, north  
& south sides of landfill - ~1 foot deep  
~2' wide - has riprap in bottom  
- moderate rain falling - flow observed  
in diversion ditches

diversion ditches



ditches maintained in good condition -  
 - no slumping, gullies or rills noticed

- check monitoring wells  
 seals & casings in good condition.
- go to former Brick Manufacturing building
- all processes now gone - stopped operation many years ago - date unknown
- building is empty except for some domestic possessions of Elmer Muffet (former owner of RBT) - old household appliances, etc.



I ask about ownership / site history

Bryant Adams explains site was operated as a brick / tile manufacturing plant & clay pit until approx 1960s.

Asl was brought to site starting in 1979 - waste pile

closure performed in 1983 - underdrain liner and toe drain constructed, then wastes placed in fill & capped.  
problems w/ ground water monitoring due to seasonal perched water, permanent aquifer is 2140' below land surface

During closure - 1983 - property was purchased from Elmer Myffet by PWT - they wanted control of site during closure

wrap up meeting - I ask for monitoring data, additional on closure & figures from geologic reports.

then take photos

Photo 1 - run on diversion ditch - N side of L.F.

Photo 2 - South side of L.F. run on diversion ditch - flowing water - due to rain fall



Photo 3 - monitoring well B-5  
(vent in background)

Photo 4 - monitoring wells - west side  
of L.F.

Photo 5 - RBT building - called "the  
Bern"

Photo 6 - vegetation on LF cover

Photo 7 - vegetation on LF cover -

lv. silk @ 1145